

Life Science Research



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Personalized Workflows for Translational Research

The journey of every therapeutic is unique. Bio-Rad offers a suite of customizable products and services that ensure efficiency, reproducibility, and reliability at each step of discovery, development, and manufacturing. With more than 60 years of experience as a global leader in life science research and clinical diagnostics, Bio-Rad provides the highest-quality integrated platforms and solutions so that you can focus on your science. Products are manufactured in ISO 13485–certified production facilities and an experienced global support team is available to partner with you to provide technical and regulatory audit support.

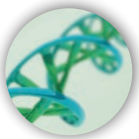
More than products: A trusted global partner

Bio-Rad’s commitment to your success does not end with your purchase. Our global support and service team is dedicated to limiting downtime and maximizing your productivity.

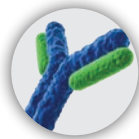


Bio-Rad workflows — Bio-Rad understands the power of an optimized workflow: systems, reagents, and software that work better together to enhance productivity and promote confidence in your science. Over the next few pages, explore examples of the various workflows Bio-Rad has to offer.

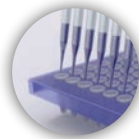
Customizable products and services from discovery to approval and release



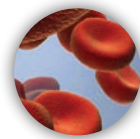
Target Discovery



Lead Discovery



Preclinical Research



Clinical Research



Process Development

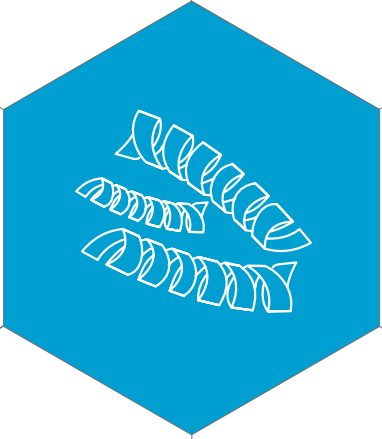


Manufacturing



Biomarker
Discovery
and Validation

Protein-Based
Immunotherapy
Development



Biosimilar
Development
and
Manufacturing



Cell and
Gene Therapy
Discovery and
Manufacturing

Gene Editing Workflow

1

TRANSFECTION

Successful gene editing starts with delivering the CRISPR-Cas9 system to your cells of interest, whether animal or human, tumor-derived or wild-type. From the Gene Pulser Xcell electroporation system to TransFectin lipid reagent, Bio-Rad offers industry-leading solutions for transfection of even the most sensitive cell lines. Automate cell counting with the TC20 automated cell counter and use the ZOE fluorescent cell imager to monitor cell health right on your bench.



Gene Pulser Xcell electroporation system, p. 346



TC20 automated cell counter, p. 28

Related Products

Helios gene gun system, p. 350

Gene Pulser/MicroPulser electroporation cuvettes, p. 348

Gene Pulser electroporation buffer, p. 345

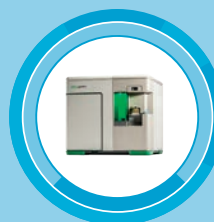
ZOE fluorescent cell imager, p. 76

TransFectin lipid reagent, p. 344

2

ENRICHMENT AND SINGLE-CELL ISOLATION

Speed up your workflow, reduce passaging, and minimize unnecessary spending on reagents and consumables by enriching transfected populations for your cells of interest. With the S3e cell sorter and ZOE fluorescent cell imager, enrichment is easily performed at the bench without the need for a core facility, shortening your workflow by up to 30 days.



S3e cell sorter, p. 32



ZOE fluorescent cell imager, p. 76

Related Products

TC20 automated cell counter, p. 28

Cell counting slides for TC20 cell counters, p. 29

S3e biosafety system class I, p. 35

Flow cytometry antibodies, pp. 286, 294

ReadiLink antibody labeling kits, p. 48

3

CONFIRMATION OF EDITS

Confirmation of successful gene editing is a key step in any CRISPR-Cas9 workflow. Bio-Rad offers a spectrum of solutions for direct detection of edits by high-fidelity PCR, real-time PCR, and high resolution melt analysis. For unmatched precision and sensitivity, leverage Droplet Digital PCR to identify mutations present even at frequencies $\leq 0.5\%$. For confirmation at the protein level, the V3 Western Workflow offers fast and accurate quantitation.



V3 Western Workflow,
p. 238



QX ONE Droplet Digital
PCR system,
p. 356

Related Products

ddPCR genome edit detection assays, p. 363	EveryBlot blocking buffer, p. 252
CFX96 and CFX384 Touch real-time PCR detection systems, p. 375	Precision melt supermix, p. 400
CFX Opus real-time PCR detection system, p. 376	PrecisionAb validated western blotting antibodies, p. 287
CFX Maestro software, p. 383	Antibodies, p. 286
PX1 PCR plate sealer, p. 407	C1000 Touch thermal cycler, p. 371
PrimePCR assays, p. 386	iTaq universal supermixes, p. 393
SsoAdvanced universal probes supermix, p. 391	iProof HF master mix, p. 405
	GelDoc systems, p. 298

4

DOWNSTREAM ANALYSIS

Bio-Rad provides tools to study your newly generated cell lines at the cellular, genomic, and proteomic levels. The flexible ZE5 cell analyzer can be run by novices and experts alike to study the effects of your edits at the cellular level. Save time with high-throughput, automated gene expression analysis using the CFX automation system II or analyze up to 100 biomolecules in a single sample with the Bio-Plex 200 system.



CFX automation system II,
p. 381



ZE5 cell analyzer,
p. 41

Related Products

CFX Opus real-time PCR detection system, p. 376	V3 Western Workflow, p. 238
QX ONE Droplet Digital PCR system, p. 356	ReadiLink antibody labeling kits, p. 48
PX1 PCR plate sealer, p. 407	PrecisionAb validated western blotting antibodies, p. 287
PrimePCR assays, p. 386	StarBright antibodies, p. 289
Aurum total RNA kits, p. 10	Antibodies, p. 286
PureZOL RNA isolation reagent, p. 11	Flow cytometry antibodies, pp. 286, 294
Reliance one-step multiplex RT-qPCR supermix, p. 395	HuCAL antibodies, p. 286
Bio-Plex assays, p. 313	Bio-Plex 200 system, p. 307

Vaccine Development Workflow

1

DISCOVERY

Evaluating the efficacy of a candidate vaccine requires analysis of diverse proteins and cell types over time. With Bio-Plex assays, you can easily monitor multiple proteins at once to determine whether the immune system is responding appropriately. For cell-based analysis, Bio-Rad offers the ZE5 cell analyzer, which can measure up to 30 parameters at once and detect rare events and cell types. The ZE5 cell analyzer is also automation-friendly for screening applications.



Bio-Plex assays,
p. 313



ZE5 cell analyzer,
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Related Products

Antibodies, p. 286
Bio-Plex cytokine assays,
p. 314

Flow cytometry antibodies,
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ReadiLink antibody labeling
kits, p. 48

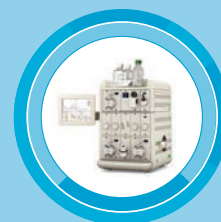
2

MANUFACTURING

Creating a cost-efficient manufacturing process that reliably produces the vaccine in sufficient levels can be challenging. Bio-Rad offers a variety of chromatography resins scalable from discovery to production. These include resins suitable for molecules that are difficult to purify using traditional chromatography resins, such as conjugate vaccines. For an automated purification scaffold that grows with you, try customizable NGC chromatography systems.



Resins,
pp. 81, 176



NGC chromatography
systems,
p. 148

Related Products

BioLogic LP systems,
p. 170
V3 Western Workflow,
p. 238
ChemiDoc imaging systems,
p. 299
Foresight Nuvia S plates,
pp. 84, 130, 177

Foresight Nuvia S
RoboColumn units,
pp. 84, 130, 177
Foresight Nuvia S columns,
pp. 84, 130, 177
Stain-free gels,
pp. 198, 205

Vaccine Development Workflow

3

PURITY ANALYSIS

As you develop a purification scheme, you will need to assess the purity of the vaccine. The GS-900 calibrated densitometer is designed for use in regulated environments and has IQ/OQ and U.S. FDA 21 CFR Part 11 compliant software tools. To ensure that the correct proteins are expressed at the desired levels, Bio-Rad offers premade conventional and custom human recombinant antibodies for quantitative ELISAs.



GS-900 calibrated densitometer, p. 302



HuCAL custom antibodies, p. 286

Related Products

V3 Western Workflow, p. 238

Stain-free gels, pp. 198, 205

TMB peroxidase substrate kits, p. 338

4

QUALITY CONTROL

Host cell contamination is an area of primary concern in vaccine manufacturing. The QX200 and QX ONE Droplet Digital PCR systems provide semi-automated and automated methods for easy quantification of host cell DNA. Unlike qPCR, Droplet Digital PCR does not require a standard curve and provides an absolute readout, which is preferred for reduction of interanalyst variability in QC. The V3 Western Workflow can be used to confirm virus identity and expression of surface proteins.



QX ONE Droplet Digital PCR system, p. 356



V3 Western Workflow, p. 238

Related Products

ddPCR residual DNA quantification kits, p. 365

CFX Opus real-time PCR detection system, p. 376

CFX Maestro software, p. 383

PrecisionAb validated western blotting antibodies, p. 287

TidyBlot reagent, p. 293

Clarity and Clarity Max ECL western blotting substrates, p. 255

QX200 Droplet Digital PCR system, p. 357

EveryBlot blocking buffer, p. 252

Cell and Gene Therapy Workflow

1

FOUNDATIONAL BIOLOGY

Developing new cell or gene therapies starts at the bench. The automation-friendly ZE5 cell analyzer is capable of measuring up to 30 parameters at once. For protein-based assays, Bio-Rad offers premade antibodies and antibody sets. When off-the-shelf antibodies don't meet your needs, try Bio-Rad's custom, fully human monoclonal antibodies from the Human Combinatorial Antibody Libraries (HuCAL). HuCAL antibodies are highly specific and can be generated in as little as eight weeks, saving valuable time.



ZE5 cell analyzer,
p. 41



HuCAL antibodies,
p. 286

Related Products

S3e cell sorter, p. 32	CFX Opus real-time PCR detection system, p. 376
Flow cytometry antibodies, pp. 286, 294	PrimePCR assays, p. 386
ReadiLink antibody labeling kits, p. 48	Aurum total RNA kits, p. 10
ReadyPrep protein extraction kit, p. 3	PureZOL RNA isolation reagent, p. 11
V3 Western Workflow, p. 238	iScript cDNA synthesis kits, p. 402
QX ONE Droplet Digital PCR system, p. 356	Reliance one-step multiplex RT-qPCR supermix, p. 395

2

PRECLINICAL/CLINICAL

Assessing the safety and efficacy of new therapies requires analyses at the cellular, nucleic acid, and protein levels. Leverage the power of the QX ONE Droplet Digital PCR system for absolute vector quantitation in prepared therapies, treated cells, or treated patients. At the cellular level, the ZE5 cell analyzer can be used to monitor changes in specific immune cell populations over time. Detect adverse effects with Bio-Plex assays, including predesigned panels for simultaneous quantification of cytokines and other immune-related proteins.



QX ONE Droplet Digital PCR system,
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Bio-Plex 200 system,
p. 307

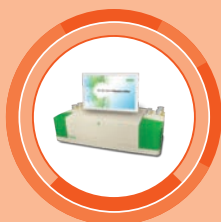
Related Products

QX200 Droplet Digital PCR system, p. 357	Reliance one-step multiplex RT-qPCR supermix, p. 395
CFX Opus real-time PCR detection system, p. 376	iScript cDNA synthesis kits, p. 402
ZE5 cell analyzer, p. 41	Bio-Plex assays, p. 313
PX1 plate sealer, p. 407	HuCAL antibodies, p. 286
PrimePCR assays, p. 386	Flow cytometry antibodies, pp. 286, 294
SsoAdvanced universal supermixes, pp. 390, 391	

3A

MANUFACTURING/QC — GENOMIC ASSAYS

As a new therapy moves toward regulatory approval, manufacturing processes must be developed that can scale up with demand while maintaining product quality. Measure titer of manufactured vectors and verify vector loading with the CFX Opus real-time PCR detection system or use the QX ONE Droplet Digital PCR system for absolute quantification without the need for a standard curve. To check purity, Bio-Rad offers ddPCR residual DNA quantification kits, providing maximum sensitivity with the convenience of prevalidated primers and probes.



QX ONE Droplet Digital PCR system, p. 356



CFX Opus real-time PCR detection system, p. 376

Related Products

QX200 Droplet Digital PCR system, p. 357

ddPCR residual DNA quantification kits, p. 365

ddPCR supermix for residual DNA quantification, p. 365

CFX96 and CFX384 Touch real-time PCR detection systems, p. 375

CFX automation system II, p. 381

CFX Maestro software, p. 383

C1000 Touch thermal cycler, p. 371

3B

MANUFACTURING/QC — PROTEIN PURIFICATION AND ASSAYS

Monitoring the yield and quality of protein components as production is scaled up is also critical. Ensure consistency of antibody-based analyses over time with custom recombinant HuCAL antibodies, which can be reproduced synthetically for batch-to-batch uniformity and long-term security of supply. Combined with the V3 Western Workflow, Bio-Rad's selection of synthetic and traditional antibodies enables quantitative verification of expression and sensitive detection of impurities. For cell therapies, use the ZE5 cell analyzer to monitor in vivo uptake of vector as scale-up necessitates changes in manufacturing and delivery.



ZE5 cell analyzer, p. 41



HuCAL antibodies, p. 286

Related Products

PrecisionAb validated western blotting antibodies, p. 287

ChemiDoc imaging systems, p. 299

V3 Western Workflow, p. 238

Antibodies, p. 286

RC DC protein assay, p. 22

Flow cytometry antibodies, pp. 286, 294

StarBright antibodies, p. 289

Clarity and Clarity Max ECL western blotting substrates, p. 255

Protein Immunotherapy Workflow

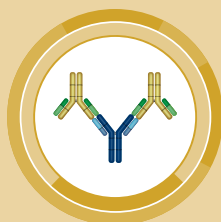
1

IMMUNE CELL ANALYSIS

To fully understand the effects of an immunotherapy, researchers must often monitor multiple pathways and cell types, which requires analytical tools that support multiparameter experiments. The fast and versatile ZE5 cell analyzer can measure up to 30 parameters per sample and can process a full 96-well plate in less than 15 minutes. Paired with Bio-Rad's extensive catalog of premade conventional and custom human recombinant antibodies, you can easily assess the full range of effects of your therapeutic.



ZE5 cell analyzer,
p. 41



Antibodies,
p. 286

Related Products

S3e cell sorter, p. 32	StarBright antibodies, p. 289
S3e biosafety system class I, p. 35	Flow cytometry antibodies, pp. 286, 294
HuCAL antibodies, p. 286	ReadiLink antibody labeling kits, p. 48
Cell health products, pp. 52, 65	

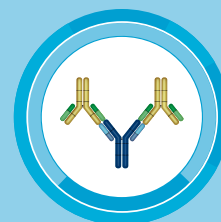
2

IMMUNE PROTEIN MONITORING

Gaining insight into the roles proteins, like cytokines, play in the immune system drives the development of the most effective treatments. Monitoring these proteins with tools that offer multiplexing, accuracy, and specificity allow you to pursue complete answers. Bio-Plex assays and systems can analyze many cytokines and other critical proteins in a single experiment. Design a custom Bio-Plex assay panel for your unique needs, or save time with premade panels. For even more flexibility, browse Bio-Rad's antibody library, including custom human recombinant antibodies.



Bio-Plex 200 system,
p. 307



Antibodies,
p. 286

Related Products

Bio-Plex assays, p. 313	ReadyPrep protein extraction kit, p. 3
V3 Western Workflow, p. 238	TidyBlot reagent, p. 293
HuCAL antibodies, p. 286	Clarity and Clarity Max ECL western blotting substrates, p. 255
StarBright antibodies, p. 289	EveryBlot blocking buffer, p. 252
PrecisionAb validated western blotting antibodies, p. 287	

3

GENOMIC ANALYSIS AND BIOMARKER DISCOVERY

Genomics play an important role in development, testing, and monitoring of immunotherapeutics. The CFX Opus real-time PCR detection system can be used with custom-built or pre-designed PrimePCR assays to measure multiple genes from many samples at once. If absolute quantification is desired, Droplet Digital PCR provides a solution without the need for a standard curve.



CFX Opus real-time PCR detection system, p. 376



QX ONE Droplet Digital PCR system, p. 356

Related Products

PrimePCR assays, p. 386
ddPCR multiplex mutation screening kits, p. 366
ddPCR copy number determination assays, p. 363
PX1 plate sealer, p. 407
SingleShot cell lysis RT-qPCR kits, p. 399
iScript cDNA synthesis kits, p. 402
Reliance one-step multiplex RT-qPCR supermix, p. 395
SsoAdvanced universal supermixes, pp. 390, 391

4

MANUFACTURING AND QUALITY CONTROL

For therapeutics built using novel scaffolds or with modifications, identifying the best resin may be complex. Bio-Rad's chromatography resins are designed for a wide range of applications and are available in multiple formats to take you from development to commercial production. Testing purity as manufacturing is scaled up requires trusted, compliance-friendly tools. The GS-900 calibrated densitometer delivers protein-based purification electrophoresis data within a regulatory framework, with IQ/OQ and U.S. FDA 21 CFR Part 11 compliant software.



Resins, pp. 81, 175



GS-900 calibrated densitometer, p. 302

Related Products

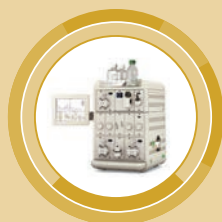
QX ONE Droplet Digital PCR system, p. 356
QX200 Droplet Digital PCR system, p. 357
ddPCR residual DNA quantification kits, p. 365
Image Lab software, p. 303

Biosimilar Development Workflow

1

PURIFICATION

Biosimilar developers are challenged with producing a product at a cost lower than that of the original biologic while sourcing a reliable stream of workflow components. Bio-Rad's NGC chromatography systems and selection of chromatography resins enable fast and easy screening of methods and components when designing a purification strategy for biosimilars. NGC chromatography systems allow addition of new capabilities as you move from discovery to manufacturing. Expedite your analyses using stain-free technology to visualize biomolecules in your gels and confirm protein transfer during western blotting.



NGC chromatography systems, p. 148



Chromatography resins and columns, pp. 81, 176

Related Products

ChemiDoc imaging systems, p. 299

Antibodies, p. 286

PrecisionAb validated western blotting antibodies, p. 287

StarBright antibodies, p. 289

ChromLab software, p. 156

Image Lab software, p. 303

Stain-free gels, pp. 198, 205

2

IMPURITIES

To ensure the safety and efficacy of a biopharmaceutical, contaminants must be identified and removed. Bio-Rad offers market-leading technologies for sensitive and robust detection of host cell DNA and proteins. The QX ONE Droplet Digital PCR system provides maximum sensitivity and absolute quantification of host cell DNA without the need for a DNA extraction step, all in an automated system. For protein contaminants, western blotting is faster and more flexible than ever before with the V3 Western Workflow solutions.



QX ONE Droplet Digital PCR system, p. 356



ddPCR residual DNA quantification kits, p. 365

Related Products

ddPCR supermix for residual DNA quantification, p. 361

Antibodies, p. 286

StarBright antibodies, p. 289

PrecisionAb validated western blotting antibodies, p. 287

HuCAL antibodies, p. 286

V3 Western Workflow, p. 238

ChemiDoc imaging systems, p. 299

Trans-Blot Turbo transfer system, p. 241

Membranes, p. 248

3

COMPARABILITY

Biosimilars must show comparability to their originator biologic across multiple factors, including structure, function, and efficacy. Designing a cell-based assay to measure comparability requires an understanding of the underlying mechanism of action of the originator and the biosimilar. The ZE5 cell analyzer enables analysis of up to 30 parameters from a single sample so that you can monitor multiple cell types and lineages at once. Isolate cell types needed for your assays using the S3e cell sorter, then easily image cells right at your bench with the ZOE fluorescent cell imager.



ZE5 cell analyzer,
p. 41



ZOE fluorescent cell imager,
p. 76

Related Products

Bio-Plex 200 system, p. 307
Bio-Plex assays, p. 313
CFX Opus real-time PCR detection system, p. 376
CFX96 and CFX384 Touch real-time PCR detection systems, p. 375
PrimePCR assays, p. 386
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Flow cytometry antibodies, pp. 286, 294
S3e biosafety system class I, p. 35
Antibodies, p. 286
S3e cell sorter, p. 32

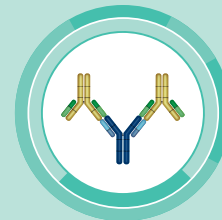
4

CHARACTERIZATION

The biosimilar must be compared to the reference product to ensure that there are no clinically meaningful differences in terms of safety, efficacy, and immunogenicity. Reagent quality in this testing is key, because results form part of the totality of evidence required by regulatory agencies. Bio-Rad's antibodytherapeutic antibodies are developed using a guided selection strategy enabling the generation of fully human, highly specific, inhibitory and non-inhibitory anti-idiotypic antibodies and specialized drug-target complex binders.



HuCAL antibodies,
p. 286



Anti-idiotypic antibodies,
p. 286

Related Products

V3 Western Workflow, p. 238
Bio-Plex 200 system, p. 307
Bio-Plex assays, p. 313

Biomarker Discovery Workflow

1

CELLULAR

The ability to uncover novel and rare cell types through multiparameter analysis allows researchers to characterize cell populations in greater detail and identify subpopulations that can serve as markers for disease. With the ZE5 cell analyzer, up to 30 parameters can be analyzed simultaneously to distinguish subtly different cell populations. Reliably isolate single cells, even for rare cell types, with the S3e cell sorter, and perform traditional immunocytochemistry and histochemistry studies for biomarkers in live or fixed cells with the benchtop ZOE fluorescent cell imager.



ZE5 cell analyzer,
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S3e cell sorter,
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Related Products

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ReadiLink antibody labeling kits, p. 48

ZOE fluorescent cell imager,
p. 76

2

PROTEOMIC

Interrogating the proteomic profile of samples can identify a myriad of potential biomarkers. The V3 Western Workflow is a validated and streamlined process that allows fast and accurate quantitation of protein expression. Antibody selection and specificity are also crucial to the performance of your proteomic assays. Bio-Rad's HuCAL custom antibody technology can generate highly specific custom human antibodies in only 8 weeks. For plate-based analysis, the Bio-Plex 200 system can be used with predesigned or customized biomarker assay panels for multiplexed protein analysis.



V3 Western Workflow,
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Bio-Plex 200 system,
p. 307

Related Products

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Antibodies, p. 286

StarBright antibodies, p. 289

PrecisionAb validated western blotting antibodies, p. 287

ReadyPrep protein extraction kits, p. 3

TidyBlot reagent, p. 293

Clarity and Clarity Max ECL western blotting substrates, p. 255

HuCAL antibodies, p. 286

3

GENOMIC

Gene expression levels and the presence of specific genetic sequences are used as biomarkers for many diseases. The emerging field of personalized medicine also uses genetic analysis to tailor treatments to patients. Bio-Rad provides powerful tools for large-scale analysis of gene expression, including the QX ONE Droplet Digital PCR system for absolute nucleic acid quantification. Reduce hands-on time by pairing predesigned PrimePCR panels, available for over 100 pathways, with the CFX automation system II for robotic plate handling compatible with CFX Touch real-time PCR detection systems.



QX ONE Droplet Digital PCR system, p. 356



CFX Opus real-time PCR detection system, p. 376

Related Products

QX200 Droplet Digital PCR system, p. 357

Droplet Digital PCR assays, p. 363

CFX automation system II, p. 381

PrimePCR panels, p. 386

SingleShot cell lysis RT-qPCR kits, p. 399

iScript cDNA synthesis kits, p. 402

Reliance one-step multiplex RT-qPCR supermix, p. 395

SsoAdvanced universal supermixes, pp. 390, 391

4

SOLUTIONS BEYOND DISCOVERY

Each biomarker's proposed downstream application defines the extent to which it must be validated before it can move forward. Whatever your validation pathway or downstream need, you must have access to a reliable stream of assay components and quality controls. Bio-Rad partners with you on your biomarker journey, providing solutions from early discovery to the clinic and beyond and meeting your needs for security of supply for critical materials.



Bio-Plex 200 system, p. 307



HuCAL antibodies, p. 286

Related Products

Bio-Plex assays, p. 313

ddPCR multiplex mutation screening kits, p. 366

Quality control products, bio-rad.com/translationalQC

Diagnostic antibodies, bio-rad.com/translationalIDA

New Products

Flow Cytometry

BrdU Antibodies

Bio-Rad is launching a range of new anti-BrdU antibodies, including new HuCAL anti-BrdU recombinant antibodies, for use in multiple applications to measure BrdU incorporation. The HuCAL anti-BrdU antibodies can easily be combined with antibodies raised in other host species, such as mouse or rat, enabling the simultaneous detection of multiple cell proliferation markers. **Page 55.**



Electrophoresis and Blotting

EveryBlot Blocking Buffer

EveryBlot blocking buffer provides 5-minute blocking and maximum sensitivity for all western blots regardless of detection method. **Page 252.**



Antibodies

Isotype Specific Secondary Antibodies

Recombinant monoclonal antibodies directed against the three main mouse isotypes, IgG1, IgG2a, and IgG2b, are an alternative to cross-adsorbed secondary antibodies. They are capable of detecting individual isotypes without any species or isotype cross-reactivity, enabling multiple unlabeled mouse monoclonal antibodies to be used simultaneously. Multiplexing is therefore straightforward and an alternative species does not need to be sourced. **Page 292.**



StarBright Fluorophores for Flow Cytometry

These unique, proprietary polymer fluorophores are conjugated to Bio-Rad's highly validated antibodies and have been specially developed to give you exceptional brightness in flow cytometry. The brightness allows easy resolution of rare populations and low-density antigens. In addition, these fluorophores have the flexibility to fit into any multicolor panel. **Page 294.**



Imaging Instruments, Analysis, and Software

GelDoc Go Imaging System

Meet the new GelDoc Go imaging system — the system you'll actually want to use. In just three clicks you can simplify your gel documentation by easily capturing everyday nucleic acid gels, protein gels, or colorimetric blots.

Although it's small in size, large gels can be quickly imaged and bands safely excised right on the system. **Page 301.**



Bio-Plex Multiplex System

Bio-Plex Pro Human Immunotherapy Panel, 20-Plex

The Bio-Plex Pro human immunotherapy 20-plex panel detects and quantifies a mix of cytokines, growth factors, and macrophage-associated proteins — valuable markers that provide insight during discovery, development, and clinical trial monitoring of immunotherapies. This multiplex panel consists of cytokine biomarkers selected specifically for the investigation of immune response associated with checkpoint inhibitors, CAR-T, immunotherapy, oncolytic virus, and immuno- and cell-based therapies. **Page 315.**



DNA Amplification/PCR

ddPCR Mycoplasma Detection Kit

The Droplet Digital PCR mycoplasma detection kit is a highly robust assay to detect the presence of mycoplasma in cell lines that are prone to outbreaks of various mycoplasma infections. This simplified multiplex mycoplasma detection solution provides absolute quantification, eliminating the need for standard curves. This easy-to-use kit is the first mycoplasma detection kit ever developed for digital PCR. **Page 367.**

DNA Amplification/PCR

CFX Opus Real-Time PCR Systems

The CFX Opus systems, our newest robust real-time PCR systems, feature improved thermal performance and our proven shuttle optics technology augmented with an updated physical and digital user experience. These are our first systems to integrate with the BR.io cloud platform. **Page 376.**



Reliance One-Step Multiplex Supermix

Reliance one-step multiplex supermix is a ready-to-use, 4x reaction mix optimized for sensitive amplification of up to five targets in a single reaction. It is formulated with an optimal enzyme blend including Reliance reverse transcriptase and Sso7d fusion polymerase, plus an advanced buffer to maximize sensitivity and efficiency in multiplex RT-qPCR reactions. Its 24-hour assembled reaction stability is adapted for automated workflows and when used with the CFX automation system II and PrimePCR probe assays, this supermix enables researchers to maximize throughput and quality of RT-qPCR data. **Page 395.**



Plastic Consumables and General Laboratory Equipment

Mini Centrifuge

The updated mini centrifuge includes microtube and PCR strip tube rotors and 0.5/0.6 ml, 0.4/0.25 ml, and 0.2 ml tube adaptors. The maximum speed is 6,000 rpm (2,000 x g). It includes a power adaptor for US/Canada, EU, UK, and Australia. **Page 436.**



Bio-Rad Explorer Educational Products

Science of Opioid Dependence Kit

Dive into the fascinating world of precision medicine by designing and executing experiments to decipher the genetic links to opioid addiction. Students perform gel electrophoresis on preamplified PCR samples of patient DNA to determine whether a mutation in a human dopamine receptor gene influences opioid dependence. They also consider environmental factors that contribute to dependence as a phenotype and suggest treatment strategies based on the results. **Page 442.**



Engineering Solutions for Global Health Kit

Bring engineering into your biology classroom as your students design a solution to a complex real-world problem: malnutrition. World hunger is a global health crisis that affects millions. Using this context, students study proteins and nutrition. In this activity, students use a Bradford assay to collect data and design a treatment proposal for protein energy undernutrition (PEU). They use an iterative engineering design approach to define the problem, create and test a prototype, and revise their solutions. **Page 443.**



Biotechnology: A Laboratory Skills Course, Second Edition

Start or enhance your biotechnology course with *Biotechnology: A Laboratory Skills Course* by J. Kirk Brown. This laboratory textbook blends science background and hands-on laboratory activities with real-world applications to prepare your students as critical thinkers in a world shaped by biotechnology. The updated second edition features new topics including CRISPR technology and more background on industrial biotechnology and biological drug development. **Page 445.**







Sample Preparation



Protein Sample Preparation	2
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Protein Sample Preparation

Magnetic Beads and Racks for Immunoprecipitation

See Also

Antibodies:
page 286.

Western blotting:
page 238.

Chemiluminescence
detection: page 255.

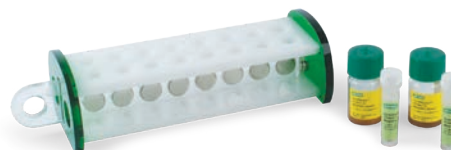
SureBeads Magnetic Beads System

SureBeads are designed for bioseparation techniques like immunoprecipitation (IP), co-immunoprecipitation (co-IP), and protein pull-down assays. SureBeads are superparamagnetic beads with surface activated hydrophilic polymers and chemically conjugated Protein A or Protein G that specifically bind to the Fc region of immunoglobulins. Proprietary chemistry enables high IgG binding and low nonspecific binding from a variety of biological samples.

Product features include:

- **Faster IP** — no centrifugation
- **Easier IP** — ergonomically designed magnetic rack magnetizes beads in seconds, making washes easy and preventing loss of beads during pipetting
- **Less antibody needed** — patented* surface chemistry enables proper antibody orientation for optimal antigen binding
- **More concentrated sample elution** — small elution volumes allow recovery of more concentrated sample
- **Reproducible** — consistent IgG binding capacity ensures accurate, reproducible results
- **Low cost to go magnetic** — priced similarly to leading agarose beads with the performance of magnetic beads

* U.S. patent 20100105879A1.



For More Information

Web: bio-rad.com/immunoprecipitation
Request or download bulletin: 6560

Try TidyBlot western blot detection reagent to avoid interference from IgG heavy or light chains when detecting about 25 or 50 kD immunoprecipitated protein in western blots.

TidyBlot

Ordering Information

Catalog #	Description
1614011	SureBeads Protein A Magnetic Beads , 1 x 1 ml vial conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension)
1614013	SureBeads Protein A Magnetic Beads , 1 x 3 ml vial conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension)
1614021	SureBeads Protein G Magnetic Beads , 1 x 1 ml vial conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension)
1614023	SureBeads Protein G Magnetic Beads , 1 x 3 ml vial conjugated magnetic immunoprecipitation beads (10 mg beads/ml suspension)
1614916	16-Tube SureBeads Magnetic Rack , with separable magnets

Protein Extraction

Protein extraction tools such as cell lysis and extraction kits, as well as mini grinders, are available for extracting proteins from cultured cells and tissues.

ReadyPrep Protein Extraction Kit

The ReadyPrep protein extraction kit (total protein) provides a simple, rapid, and reproducible method for preparation of total cellular protein extracts from a wide variety of biological samples. Use of this kit generates protein samples that can be applied directly to a variety of methods, including IEF and 2-D gel electrophoresis.

For More Information

Web: bio-rad.com/proteinextraction



Ordering Information

Catalog #	Description
1632086	ReadyPrep Protein Extraction Kit (Total Protein), 20 preps

Kits for Cell Lysis

Bio-Plex Cell Lysis Kit

This cell lysis kit is used to prepare cell lysates for western blot analysis. Its protein extraction procedure yields western blotting results similar to those generated by routine cell lysis and protein extraction protocols.

For More Information

Web: bio-rad.com/proteinextraction and [/bioplexcelllysis](http://bio-rad.com/bioplexcelllysis)

Download bulletins: 3033 and 3034

ReadyPrep Mini Grinders

For grinding small biological samples for high recovery of proteins (and nucleic acids), each mini grinder includes a 1.5 ml grinding tube containing a grinding resin and a matching pestle. The grinding resin is a neutral abrasive material made of high tensile strength microparticles that do not bind to proteins or nucleic acids. ReadyPrep mini grinders are disposable and are nuclease- and protease-free. The mini grinder tubes fit conveniently in most benchtop centrifuges.

For More Information

Web: bio-rad.com/proteinextraction



See Also

Protein assay kits:
page 20.

Ordering Information

Catalog #	Description
1632146	ReadyPrep Mini Grinders, includes 20 mini grinders, sufficient for twenty 100 mg extractions

Bio-Plex Cell Lysis Kits

171304011	Bio-Plex Cell Lysis Kit, 1 x 96-well, includes cell lysis and wash buffers, factor 1 and factor 2
171304012	Bio-Plex Cell Lysis Kit, 10 x 96-well, includes cell lysis and wash buffers, factor 1 and factor 2

Protein Sample Cleanup

General-purpose cleanup kits and columns are available for the removal of salts and other contaminants.

See Also

Bio-Spin gel filtration columns: page 16.

Micro Bio-Spin gel filtration columns: page 16.

Protein Sample Cleanup Kit Selection Guide

Kit Type and Catalog Number	Applications	Procedure	Preparation Time	Number of Preps
Salt Removal				
ReadyPrep 2-D cleanup kits (#1632130, #1632140)	Cleanup of protein samples for 1-D and 2-D applications Reduction of streaking on 2-D gels Concentration of dilute samples	TCA-like precipitation to remove salts, detergents, lipids, phenolic compounds	<1 hr	50
Micro Bio-Spin P-6 columns (see pages 16–17)	Removal of salts and other contaminants	Size exclusion chromatography	5 min	25, 100
Removal of Other Contaminants				
ReadyPrep 2-D cleanup kits (#1632130, #1632140)	Reduction of streaking on 2-D gels Concentration of dilute samples	TCA-like precipitation to remove salts, detergents, lipids, phenolic compounds	<1 hr	50
Reduction and Alkylation				
ReadyPrep reduction-alkylation kit (#1632090)	Reduction of streaking on 2-D gels Improved resolution of basic proteins	Reduction, then alkylation of sample to remove disulfide bonds and prevent their re-formation	<2 hr	100

For More Information

Web: bio-rad.com/proteincleanup

Download bulletins: 2934 and 2961

Ordering Information

Catalog # Description

ReadyPrep Kits

1632130	ReadyPrep 2-D Cleanup Kit, 50 preps
1632140	ReadyPrep 2-D Cleanup Kit, 5 preps
1632105	ReadyPrep 2-D Starter Kit, includes protein sample and reagents sufficient to rehydrate, focus, and transfer to second-dimension gels; six 17 cm, ten 11 cm, or sixteen 7 cm ReadyStrip IPG strips (ReadyStrip IPG strips,* precast SDS-PAGE gels, and gel stains not included in kit)
1632090	ReadyPrep Reduction-Alkylation Kit, 100 preps

ReadyPrep Kit Components and Related Products

1632091	ReadyPrep Proteomics Grade Water, 500 ml
1632083	ReadyPrep 2-D Rehydration/Sample Buffer 1, 10 ml, 7 M urea, 2 M thiourea, 1% ASB-14, 40 mM Tris, 0.001% bromophenol blue
1632106	ReadyPrep 2-D Starter Kit Rehydration/Sample Buffer, 10 ml, 8 M urea, 2% CHAPS, 50 mM DTT, 0.2% Bio-Lyte 3/10 ampholyte, 0.001% bromophenol blue

Reducing and Alkylating Agents

1610611	Dithiothreitol (DTT), 5 g
1632101	Tributylphosphine (TBP), 200 mM, 0.6 ml
1632109	Iodoacetamide, 30 g

* See the prepacked Bio-Spin and Micro Bio-Spin gel filtration columns on pages 16–17.

Protein Fractionation

Fractionation kits reduce sample complexity, helping to identify low-abundance proteins. Fractionation kits can be subdivided into three groups that fractionate based on differential solubility, cellular location of the proteins of interest, and protein charge.

Fractionation by Solubility

Fractionation Using Differential Protein Solubility

The ReadyPrep sequential extraction kit and the ReadyPrep protein extraction kit (soluble/insoluble) both reduce sample complexity using differential solubilization. The two kits can be used independently, or the rehydration/sample buffer from the soluble/insoluble kit can be used with the sequential extraction kit to create a fourth fraction for even better resolution.

- **ReadyPrep sequential extraction kit** — enables the isolation of 3 different fractions of increasing solubility. These fractions are isolated sequentially, allowing the

visualization of proteins that might not otherwise be seen. Increasing solubilization strength is provided through the use of stronger detergents for each subsequent fraction

- **ReadyPrep protein extraction kit (soluble/insoluble)** — uses a single fractionation step

ReadyPrep Kit Components and Related Products

Individual ReadyPrep kit components and related products such as reducing agents are also available.

For More Information

Web: bio-rad.com/proteinfractionation
Download bulletins: 2934 and 2961

Ordering Information

Catalog #	Description
ReadyPrep Kits	
1632100	ReadyPrep Sequential Extraction Kit, 15 preps
1632085	ReadyPrep Protein Extraction Kit (Soluble/Insoluble), 20 preps
ReadyPrep Kit Components and Related Products	
1632103	ReadyPrep Sequential Extraction Kit Reagent 2, 10 ml, 8 M urea, 4% CHAPS, 40 mM Tris base, 0.2% Bio-Lyte 3/10 ampholyte
1632104	ReadyPrep Sequential Extraction Kit Reagent 3, 10 ml, 5 M urea, 2 M thiourea, 2% CHAPS, 2% SB 3-10, 40 mM Tris base, 0.2% Bio-Lyte 3/10 ampholyte
1632083	ReadyPrep 2-D Rehydration/Sample Buffer 1

ReadyPrep Kits

ReadyPrep Kit Components and Related Products

Fractionation by Cellular Location

Fractionation by Cellular Location

ReadyPrep protein extraction kits facilitate fractionation of proteins from different cellular locations such as the membrane, nucleus, or cytoplasm.

- **ReadyPrep protein extraction kit (cytoplasmic/nuclear)** — prepares fractions enriched in cytoplasmic or nuclear proteins from eukaryotic samples
- **ReadyPrep protein extraction kit (membrane I)** — offers a quick and effective protocol for isolating most membrane proteins. It does not require ultracentrifugation or preparation of density gradients
- **ReadyPrep protein extraction kit (membrane II)** — offers a protocol for isolating more complex membrane proteins
- **ReadyPrep protein extraction kit (signal)** — for isolating proteins involved in intracellular membrane trafficking and signaling pathways. These include GPI-anchored proteins, caveolin and associated proteins, acylated tyrosine kinases, and G proteins

For More Information

Web: bio-rad.com/proteinfractionation

Download bulletins: 2934 and 2961

Ordering Information

Catalog #	Description
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ReadyPrep Kits

1632089	ReadyPrep Protein Extraction Kit (Cytoplasmic/Nuclear), 50 preps
1632088	ReadyPrep Protein Extraction Kit (Membrane I), 50 preps
1632084	ReadyPrep Protein Extraction Kit (Membrane II), 10 preps
1632087	ReadyPrep Protein Extraction Kit (Signal), 50 preps

Related Products

1632083	ReadyPrep 2-D Rehydration/Sample Buffer 1
1632085	ReadyPrep Protein Extraction Kit (Soluble/Insoluble), 20 preps

Protein Depletion

Complex samples often require depletion of high-abundance proteins to allow the detection of the low-abundance ones. Bio-Rad offers two different methodologies for protein depletion — the ProteoMiner protein enrichment system (which utilizes hexapeptide libraries) and Aurum serum and Affi-Gel Blue products (which utilize resins).

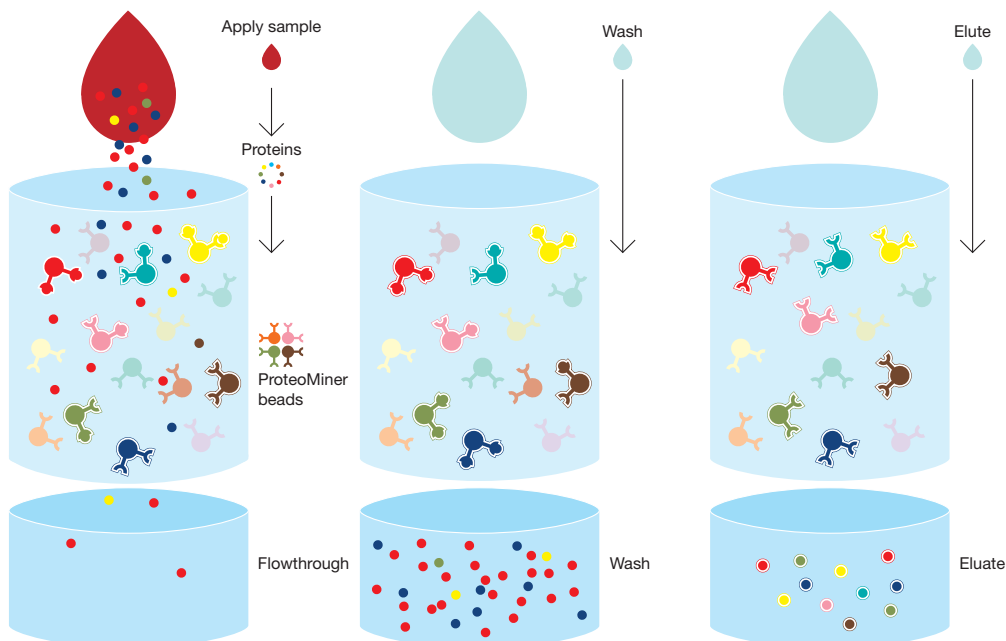
ProteoMiner Protein Enrichment System

The ProteoMiner protein enrichment system is a novel sample preparation tool for reducing the dynamic range of protein concentrations in complex biological samples. The ProteoMiner system:

- Enriches and concentrates low-abundance proteins that cannot be detected through traditional methods
- Works with a variety of sample types (serum, plasma, urine, bile, cell lysates, tissues, and platelets) and is not limited by the species' origin
- Utilizes a combinatorial library of hexapeptides rather than immunodepletion, minimizing dependence on available antibodies and preventing the codepletion of low-abundance proteins

ProteoMiner Protein Enrichment Kits — these kits can be used with a variety of biological samples and are compatible with all major downstream proteomics applications. Small- and large-capacity kits are available for processing two or ten samples.

ProteoMiner Sequential Elution Kits — these kits utilize multiple elution reagents to sequentially elute proteins based on different properties.



ProteoMiner technology is based on the interaction of complex protein samples with a large, highly diverse library of hexapeptides bound to chromatographic supports. In theory, each unique hexapeptide binds to a unique protein sequence. Because the bead capacity limits binding capacity, high-abundance proteins quickly saturate their ligands (red and yellow beads) and excess protein is washed out during the procedure. In contrast, low-abundance proteins are concentrated on their specific ligands (pink and teal beads), thereby decreasing the dynamic range of proteins in the sample. When analyzed in downstream applications, the number of low-abundance proteins detected is dramatically increased.

ProteoMiner Small- and Large-Capacity Kits

ProteoMiner kits for protein enrichment are now offered in formats optimized for varying starting amounts of sample protein.

- **Small-capacity kits** — optimized for use with limited sample material (minimum 10 mg of protein is recommended)
- **Large-capacity kits** — optimized for use with samples in which at least 50 mg of protein is available

For More Information

Web: bio-rad.com/proteominer

Download bulletins: 5632, 5635, and 5841

Ordering Information

Catalog #	Description
1633006	ProteoMiner Protein Enrichment Small-Capacity Kit , 10 preps, for processing 10 mg of total protein, includes 10 spin columns, wash buffer, elution reagents, collection tubes
1633007	ProteoMiner Protein Enrichment Large-Capacity Kit , 10 preps, for processing 50 mg of total protein, includes 10 spin columns, wash buffer, elution reagents, collection tubes
1633008	ProteoMiner Protein Enrichment Introductory Small-Capacity Kit , 2 preps, for processing 10 mg of total protein, includes 2 spin columns, wash buffer, elution reagents, collection tubes
1633009	ProteoMiner Protein Enrichment Introductory Large-Capacity Kit , 2 preps, for processing 50 mg of total protein, includes 2 spin columns, wash buffer, elution reagents, collection tubes

ProteoMiner Sequential Elution Kits

1633010	ProteoMiner Sequential Elution Small-Capacity Kit , 10 preps, for processing 10 mg of total protein, includes 10 spin columns, wash buffer, 4 sequential elution reagents, collection tubes
1633011	ProteoMiner Sequential Elution Large-Capacity Kit , 10 preps, for processing 50 mg of total protein, includes 10 spin columns, wash buffer, 4 sequential elution reagents, collection tubes

ProteoMiner Kit Accessories

1633003	ProteoMiner Sequential Elution Reagents , 10 preps, includes reagents only (columns not included), to be used with #1633006 or #1633007
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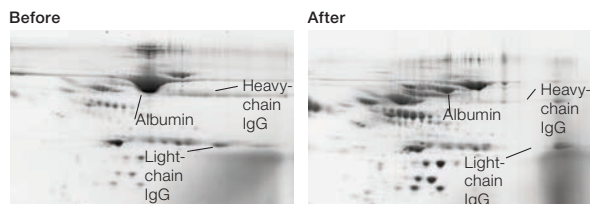
Aurum Kits and Columns

The Aurum Affi-Gel Blue and Aurum serum kits and columns use affinity chromatography to reduce albumin and IgG, which improves analysis of lower abundance proteins. These products utilize a quick and easy spin-column format and provide eluted proteins ready for analysis.

For More Information

Web: bio-rad.com/proteindepletion

Download bulletin: 2823



Removal of albumin and IgG from serum using the Aurum serum protein mini kit. Total protein (1.32 mg) was purified on an Aurum serum protein mini column. **Left**, untreated serum; **right**, serum treated with the Aurum kit.

Ordering Information

Catalog #	Description
7326701	Aurum Serum Protein Mini Kit , 10 pack, includes columns and buffers
7326708	Aurum Affi-Gel Blue Mini Columns , 25 pack

Nucleic Acid Sample Preparation

RNA Isolation

Bio-Rad offers a broad range of sample preparation products for RNA isolation. Scalable and high-throughput products are available.

RNA Isolation Product Selection Guide

	Aurum Total RNA Kits			PureZOL RNA Isolation Reagent
	Mini Kit	Fatty and Fibrous Tissue Kit	96 Kit	
Format	Mini column filtration (vacuum or spin)	Mini column filtration (vacuum or spin)	96-well plate filtration (vacuum or spin)	Single solution organic extraction
Maximum starting material amounts				
Cultured cells	2 x 10 ⁶	1 x 10 ⁷	1 x 10 ⁶	1 x 10 ⁷
Bacterial cells	2.4 x 10 ⁹	2.4 x 10 ⁹	8 x 10 ⁸	2.4 x 10 ⁹
Yeast cells	3 x 10 ⁷	3 x 10 ⁷	2 x 10 ⁷	3 x 10 ⁷
Hard animal tissue	20 mg	100 mg	—	100 mg
Soft to moderately hard animal tissue	40 mg	100 mg	—	100 mg
Plant tissue	40 mg	100 mg	—	100 mg
Isolation method	Silica membrane	Lysis with PureZOL reagent, purification on silica membrane	Silica membrane	Organic extraction
Number of preps	50	50	192 (2 x 96-well plate)	50 or 100 (1 ml/prep)
Number of washes	3	3	3	—
DNase I included*	Yes	Yes	Yes	No
DNase I digest time	15 min (animal tissue, 25 min)	15 min	10 min	—
Total preparation time**	<50–80 min (with DNase I digest)	<50–80 min (with DNase I digest)	<60 min (with DNase I digest)	<60 min
Binding capacity	>100 µg	>100 µg	>40 µg	—
Maximum elution volume	80 µl (2 x 40 µl elutions)	2 x 40 µl	80 µl	30–100 µl
Yield***	20–30 µg/2 x 10 ⁶ NIH 3T3 cells 20–40 µg/2 x 10 ⁶ HeLa cells 15–20 µg/40 mg brain 30–55 µg/20 mg thymus 15–30 µg/40 mg spleen 8–15 µg/40 mg liver 15–20 µg/40 mg kidney 8–15 µg/40 mg lung 15–30 µg/40 mg potato 20–30 µg/3 x 10 ⁷ <i>S. cerevisiae</i> cells 35–55 µg/2.4 x 10 ⁹ <i>E. coli</i> cells 35–55 µg/2.4 x 10 ⁹ <i>B. cereus</i> cells	140–150 µg/1 x 10 ⁷ 293H cells 90–100 µg/100 mg brain 50–60 µg/100 mg breast 80–90 µg/100 mg heart 60–70 µg/100 mg skin 50–60 µg/100 mg cartilage 20–30 µg/2.4 x 10 ⁹ <i>E. coli</i> cells 60–65 µg/3 x 10 ⁷ <i>S. cerevisiae</i> cells 90–100 µg/100 mg potato 5–10 µg/100 mg <i>Arabidopsis</i> 10–15 µg/50 mg <i>A. niger</i>	10 µg/1 x 10 ⁶ NIH 3T3 cells 17 µg/1 x 10 ⁶ HeLa cells 11 µg/2 x 10 ⁷ <i>S. cerevisiae</i> cells 5 µg/8 x 10 ⁸ <i>E. coli</i> cells 5 µg/8 x 10 ⁸ <i>B. cereus</i> cells	1.37 µg/1 x 10 ⁵ 293H cells 1.15 µg/mg brain 1.37 µg/mg fat 1.2 µg/mg heart 0.66 µg/mg cartilage 1.2 µg/mg skin 1.0 µg/mg potato 0.1 µg/mg <i>Arabidopsis</i> 0.38 µg/mg <i>A. niger</i> 0.63 µg/2.4 x 10 ⁷ <i>E. coli</i> cells 0.31 µg/3 x 10 ⁵ <i>S. cerevisiae</i> cells
Purity	A ₂₆₀ /A ₂₈₀ of 1.9–2.1	A ₂₆₀ /A ₂₈₀ of 1.9–2.1	A ₂₆₀ /A ₂₈₀ of 1.9–2.1	A ₂₆₀ /A ₂₈₀ of 1.9–2.1

* Removal not required.

** Total preparation time will vary depending on the tissue or cell type and on which format is used (vacuum or spin).

*** Yields will vary depending on the developmental stage, tissue type or cell line, and growth conditions used.

See Also

PCR reagents:
page 388.

Real-time PCR
systems: page 375.
Experion automated
electrophoresis
system: page 277.

DNA amplification/PCR:
page 355.

See Also

PureZOL reagent:
page 11.

Lipid transfection
reagents:
page 343.

DNA amplification/PCR:
page 355.

Aurum Total RNA Kits

Aurum total RNA kits are designed and formulated to assist in the isolation of highly pure and intact RNA from a variety of starting materials. Isolated RNA is compatible with downstream applications including real-time qPCR, northern blotting, microarray analysis, and cDNA library construction.

- Isolate high yields of RNA from a wide range of sample types in less than 60 min
- DNase treatment ensures genomic DNA removal
- Produce ready-to-use RNA suitable for the most demanding downstream applications

Aurum total RNA kits offer streamlined processing using a choice of vacuum- or spin-mediated protocols. If vacuum-mediated purification is preferred, the protocol may be performed with a vacuum manifold.*

For More Information

Web: bio-rad.com/rna-isolation

Download bulletins: 2919, 2920, and 5282

Aurum Total RNA Mini Kit

The Aurum total RNA mini kit produces DNA-free total RNA from a wide range of starting materials, including cultured cells, bacteria, and yeast, as well as animal and plant tissues. The kit utilizes a stringent reagent composed of guanidine isothiocyanate and β -mercaptoethanol for efficient sample lysis and quick RNase inactivation, followed by purification on silica membrane in a spin-column format using a spin- or vacuum-mediated protocol. The kit can also be used for RNA cleanup and desalting.

Aurum Total RNA Fatty and Fibrous Tissue Kit

The Aurum total RNA fatty and fibrous tissue kit isolates total RNA from samples that are difficult to disrupt. The kit is effective for purifications involving fatty and fibrous tissues or samples, such as fungi, that are rich in RNases. The kit utilizes PureZOL RNA reagent, a potent phenol-based reagent, which effectively lyses tissues and cells. The kit includes spin columns that can be processed using a choice of vacuum- or spin-mediated protocols.



Aurum Total RNA Fatty and Fibrous Tissue Kit

Aurum Total RNA 96 Kit

The Aurum total RNA 96 kit reproducibly isolates DNA-free total RNA from cultured cells, bacteria, and yeast in less than 60 minutes in a 96-well format for high-throughput total RNA isolation. The total RNA binding plate is designed for use on the Aurum vacuum manifold.*

Consumables and Accessories

The reagents and plasticware used in the Aurum RNA kits are available as refill orders. These products can be ordered separately from the Aurum total RNA kits.

* The Aurum vacuum manifold is no longer available. Please contact Bio-Rad Technical Support for information on alternative products.

Ordering Information

Catalog #	Description
7326820	Aurum Total RNA Mini Kit , 50 preps, includes 50 RNA binding columns, 50 capless collection tubes (2.0 ml), 100 capped sample tubes (2.0 ml), 50 capped sample tubes (1.5 ml), 1 vial lyophilized DNase I, RNase-free reagents
7326830	Aurum Total RNA Fatty and Fibrous Tissue Kit , 50 preps, includes #7326870, 50 ml PureZOL RNA isolation reagent
7326870*	Aurum Total RNA Fatty and Fibrous Tissue Module , 50 preps, includes 50 RNA binding columns, 50 capless collection tubes (2.0 ml), 100 capped sample tubes (2.0 ml), 50 capped sample tubes (1.5 ml), 1 vial lyophilized DNase I, RNase-free reagents, and plasticware
7326800	Aurum Total RNA 96 Kit , 2 x 96-well preps, includes 2 grow blocks, sealing tape, 2 RNA binding plates, 2 collection microplates, 2 vials lyophilized DNase I, RNase-free reagents

Aurum Consumables and Accessories

7326828	DNase I , RNase-free, lyophilized, 1 vial
7326802	Aurum Total RNA Lysis Solution , RNase-free, 85 ml
7326803	Aurum Total RNA Wash High-Stringency Solution , RNase-free, 150 ml
7326804	Aurum Total RNA Wash Low-Stringency Solution , 60 ml
7326826	Aurum RNA Binding Mini Columns , 50

* Does not include PureZOL RNA isolation reagent (see catalog #7326880 or #7326890 to order separately).

PureZOL RNA Isolation Reagent

The PureZOL RNA isolation reagent protocol is an improvement over the rapid, widely used, and proven method of RNA isolation developed by Chomczynski and Sacchi (1987). PureZOL RNA isolation reagent is a potent monophasic combination of phenol and the chaotropic agent guanidine isothiocyanate, which effectively lyses cells and tissues, deproteinates RNA, and inactivates endogenous nucleases in a single step. DNA and protein are efficiently removed from the RNA following phase separation.

The ready-to-use PureZOL RNA isolation reagent is a versatile and efficient means of isolating high yields of RNA from a variety of sources including cultured cells, animal and plant tissue, yeast, virus, and bacteria samples. The single-solution format permits recovery of RNA from small quantities of tissues or cells, making it ideally suited for gene expression analysis or whenever sample quantities are limited. Total RNA isolated using PureZOL RNA isolation reagent is free of



DNA and protein and can be used for northern blot analysis, in vitro translation, poly(A)+ selection, RNase protection assays, RT-PCR, and molecular cloning. Since no spin columns are used in the protocol, the protocol is scalable to accommodate a wide range of sample sizes.

For More Information
Web: bio-rad.com/purezol

See Also

Aurum total RNA kits:
page 10.

Ordering Information

Catalog #	Description
7326880	PureZOL RNA Isolation Reagent , 50 ml
7326890	PureZOL RNA Isolation Reagent , 100 ml

iScript RT-qPCR Sample Preparation Reagent

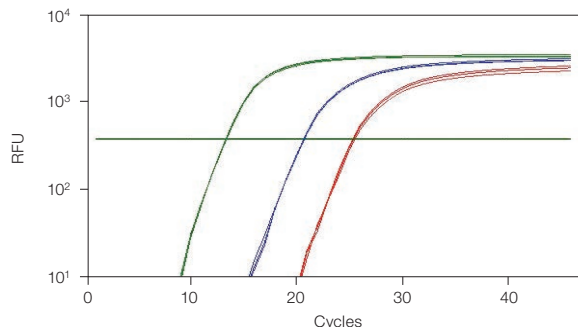
iScript RT-qPCR sample preparation reagent enables efficient cell lysis and RNA stabilization for sensitive quantitative gene expression analysis without RNA purification. This unique reagent accelerates and streamlines RT-qPCR analysis of cultured cells by eliminating the need to purify RNA. Reverse transcription and real-time PCR (qPCR) can be performed directly from cell lysates. This reagent is ideal for rapid, high-throughput gene expression analysis such as validation of siRNA-mediated gene knockdown.

- Rapid protocol (5–10 min) efficiently stabilizes RNA
- Sensitive detection of high-, medium-, and low-copy number gene targets directly from cell lysates
- Reagent enables multiplex qPCR detection of up to 4 targets from as few as 10 cells

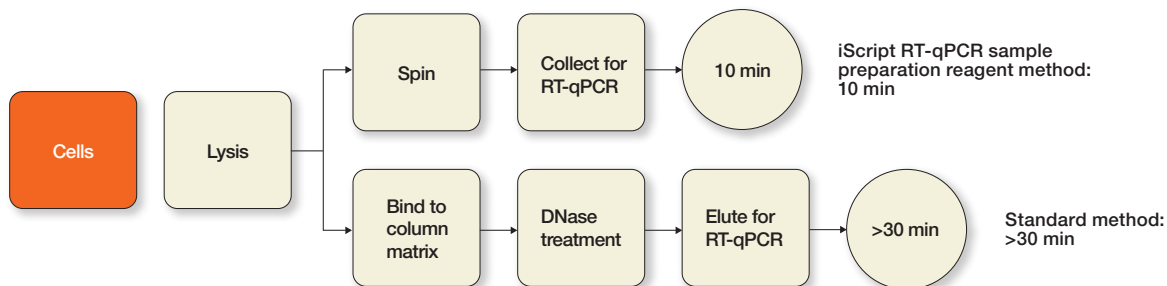
For More Information

Web: bio-rad.com/iScript-sampleprep

Request or download bulletin: 5736



iScript RT-qPCR sample preparation reagent provides rapid yet sensitive gene expression results for high-, medium-, and low-copy number gene targets. HeLa cells were treated with iScript RT-qPCR sample preparation reagent at 125 cells/μl and the expression levels of three different genes were assessed. 18S rRNA (—), β-tubulin (—), and CMYC (—) expression levels were determined by performing reverse transcription (iScript cDNA synthesis kit) and qPCR (iQ SYBR[®] Green supermix) directly from cell lysate preparations. RFU, relative fluorescence units.



Ordering Information

Catalog #	Description
1708898	iScript RT-qPCR Sample Preparation Reagent , 100 reactions, 10 ml, contains RNase inhibitors and RNA stabilizers
1708899	iScript RT-qPCR Sample Preparation Reagent , 500 reactions, 5 x 10 ml, contains RNase inhibitors and RNA stabilizers

DNA Isolation

DNA Isolation Kit Selection Guide

Kit	DNA Yield	Preparation Time	Bacterial Culture Volume	Purification Format	Binding Matrix	Growth Media
Quantum Prep plasmid miniprep	≤40 µg	<15 min	1–10 ml	Spin	Diatomaceous earth	Enriched or standard
Quantum Prep plasmid midiprep	≤400 µg	45 min	20–40 ml	Spin	Diatomaceous earth	Enriched or standard
Aurum plasmid mini	≤20 µg	<10 min	1–5 ml	Vacuum and spin	Silica membrane	Standard

Quantum Prep Plasmid Kits

Quantum Prep Plasmid Miniprep Kit

The Quantum Prep miniprep kit offers high quality and yield in an easy spin-based procedure that takes less than 15 minutes from cell culture to purified plasmid. Plasmid DNA is recovered in water or TE for immediate use in all downstream molecular biology applications.

Quantum Prep Plasmid Midiprep Kit

The Quantum Prep plasmid midiprep kit uses a simple spin-column procedure that significantly reduces the time required to generate the large quantities of plasmid DNA needed to support applications such as transfection, subcloning, and other enzymatic manipulations.

For More Information

Web: bio-rad.com/quantum-prep

Download bulletin: 2325



Quantum Prep Plasmid Miniprep Kit

Quantum Prep Plasmid Midiprep Kit



Ordering Information

Catalog #	Description
7326100	Quantum Prep Plasmid Miniprep Kit , 100 preps, includes 25 ml cell resuspension solution, 25 ml cell lysis solution, 25 ml neutralization solution, 20 ml Quantum Prep matrix, 63 ml wash solution, 100 spin columns
7326120	Quantum Prep Plasmid Midiprep Kit , 20 preps, includes 110 ml cell resuspension solution, 110 ml cell lysis solution, 110 ml neutralization solution, 20 ml Quantum Prep matrix, 125 ml wash solution, 20 midi spin columns

Nucleic Acid Sample Preparation

DNA Isolation

bio-rad.com/nasampleprep

See Also

Lipid transfection reagents: page 343.

DNA amplification/PCR: page 355.

Aurum Plasmid Mini Kit

The easy-to-use Aurum plasmid mini kit improves the efficiency and throughput of plasmid purifications with a simple bind-wash-elute protocol using silica membranes, all in less than 10 minutes. Spin- and vacuum-mediated protocols are available. The purified plasmid DNA can be immediately used in any downstream molecular biology application.

The Aurum plasmid mini kit delivers high yields of reproducible plasmid DNA preparations for:

- Automated fluorescence-based sequencing
- Restriction digestion
- Ligation and transformation
- Transfection
- PCR



For More Information

Web: bio-rad.com/aurum-plasmid

Download bulletin: 2664

Ordering Information

Catalog #	Description
7326400	Aurum Plasmid Mini Kit , 100 preps, includes plasmid-binding mini columns, 100 capless collection tubes, reagents, protocol overview

See Also

Molecular biology and biotechnology grade resins: page 94.

InstaGene Matrix

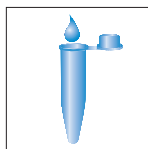
InstaGene matrix is designed for rapid isolation of small amounts of genomic DNA of sufficient purity for PCR in less than an hour. The specially formulated 6% w/v Chelex resin adsorbs cell lysis products that interfere with PCR, leaving genomic DNA template in the supernatant where it is immediately available for PCR reactions.

For More Information

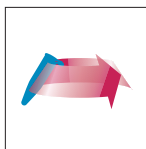
Web: bio-rad.com/instagene-matrix

Download bulletin: 2074

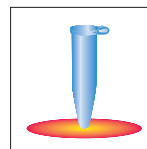
InstaGene Protocol



Add bacterial colony to water.



Spin and remove supernatant.



Add InstaGene matrix and incubate at 56°C for 30 min. Vortex and incubate at 100°C for 8 min.



Spin; use supernatant for PCR.

Ordering Information

Catalog #	Description
7326030	InstaGene Matrix , 20 ml, sufficient for 100 extractions

Chelex 100 Molecular Biology Grade Resin

Nuclease and ligase inhibitor-free, this pipettable, small-scale resin is certified not to inhibit PCR and ensures complete removal of PCR inhibitors and metal ions.

For More Information

Web: bio-rad.com/dna-isolation

Download bulletin: 2074

See Also

Molecular biology and biotechnology grade resins: page 94.

Ordering Information

Catalog #	Description
1421253	Chelex 100 Resin , molecular biology grade, 50 g, sodium, 200–400 dry mesh, 75–150 µm wet bead

DNA Cleanup

Bio-Rad offers a variety of sample preparation and cleanup columns; many are also suitable for DNA fragment purification.

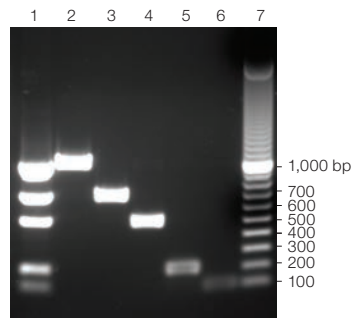
Freeze 'N Squeeze DNA Gel Extraction Spin Columns

Freeze 'N Squeeze spin columns offer a filtration-based purification method, which provides a quick and effective alternative to chemical extraction and electroelution methods. The Freeze 'N Squeeze method uses centrifugation to draw 50–23,000 bp DNA out of agarose gel slices that have been quickly frozen and thawed. Features include:

- No solutions to prepare — save time and avoid using toxic chaotropic materials
- DNA immediately available for PCR, subcloning, ligations, and sequencing reactions
- Less than 1 min of hands-on time

For More Information

Web: bio-rad.com/freeze-n-squeeze



Recovery of DNA fragments using Freeze 'N Squeeze spin columns.

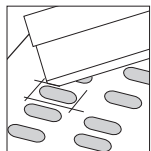
Extracted fragments were rerun on a ReadyAgarose 1% TAE gel. Lane 1, precision molecular mass ruler; lane 7, EZ Load 100 bp PCR molecular ruler.

See Also

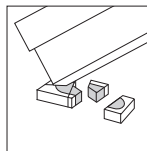
ReadyAgarose precast gel system: page 267.

DNA ladders: page 275.

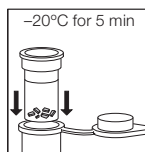
Freeze 'N Squeeze Method



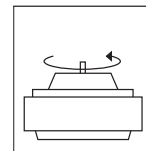
Cut out gel slice.



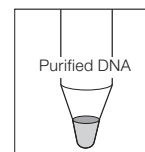
Chop into pieces.



Transfer to spin column and freeze for 5 min.



Spin for 3 min.



Recover purified DNA.

Ordering Information

Catalog #	Description
7326165	Freeze 'N Squeeze DNA Gel Extraction Spin Columns , 25 columns
7326166	Freeze 'N Squeeze DNA Gel Extraction Spin Columns , 100 columns

Prepacked Spin Columns

Prepacked size exclusion spin columns allow easy cleanup and purification of DNA and proteins from lower MW contaminants. Bio-Spin, Micro Bio-Spin, and PCR Kleen columns clean up DNA or protein samples quickly and easily using size exclusion chromatography.

These columns are available in multiple sizes and offer multiple MW exclusion limits to accommodate a variety of needs. Use the chart below to choose the column that best meets your needs.

Prepacked Spin Column Selection Guide

	Bio-Spin P-6	Micro Bio-Spin P-6	Bio-Spin P-30	Micro Bio-Spin P-30	PCR Kleen
Packed support	Special grade Bio-Gel P-6 gel	Special grade Bio-Gel P-6 gel	Special grade Bio-Gel P-30 gel	Special grade Bio-Gel P-30 gel	Special grade size exclusion gel
Equilibration buffer	10 mM Tris, pH 7.4, or SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*	10 mM Tris, 1 mM EDTA, pH 7.0
Applications					
Desalting of oligonucleotides >20 bases	•	•	—	—	—
Labeling reactions: removal of unincorporated nucleotides >20 bases or bp from DNA	—	—	•	•	—
Removal of primers and primer-dimers from PCR products >200 bp	—	—	—	—	•
Buffer exchange (restriction fragments, PCR products, enzyme reactions, sequencing templates)	•	•	—	•	—
DNA sequencing reaction mixture cleanup**	—	—	•	•	—
Riboprobe cleanup***	—	—	—	•	—
Desalting of antibody, enzyme, and protein solutions	•	•	—	•	—
Purification of proteins of molecular weight >6,000	•	•	—	—	—
Purification of proteins of molecular weight >40,000	—	—	•	•	—
Bed volume	1.1 ml	0.7 ml	1.1 ml	0.7 ml	0.6 ml
Retention and recovery	90% recovery of 20 bases or bp, 99% retention of salts	90% recovery of 20 bases or bp, 99% retention of salts	95% recovery of 22 bases or bp, 98% retention of ddNTPs	95% recovery of 22 bases or bp, 98% retention of ddNTPs	85% recovery of ≥700 bp, 95% retention of primers and primer-dimers
Molecular weight exclusion limit, globular proteins	6,000	6,000	40,000	40,000	8,000,000
Sample volume	50–100 µl	10–75 µl	50–100 µl	10–75 µl	25–100 µl
Centrifuge type	Swinging bucket	Microcentrifuge	Swinging bucket	Microcentrifuge	Microcentrifuge
Autoclavability	Yes	Yes	Yes	Yes	Yes

* 150 mM NaCl, 17.5 mM sodium citrate, pH 7.0.

** In Tris buffer.

*** In RNase-free Tris buffer.

See Also

Empty columns:
page 140.
Bio-Gel P resin:
page 116.
Bio-Spin,
Micro Bio-Spin, and
Mini Bio-Spin
empty columns:
page 140.

Prepacked Bio-Spin and Micro Bio-Spin Columns

Bio-Spin and Micro Bio-Spin columns clean up and remove salts, nucleotides, dye terminators, and small molecules from DNA, RNA, and protein samples in 10 minutes. Filled with specially sized Bio-Gel P gels, these columns are shipped fully hydrated in Tris or SSC buffer. They yield 95% recovery of DNA >22 bp and allow sample loads of 10–100 µl. For safe riboprobe preparation use RNase-free Micro Bio-Spin P-30 Tris spin columns.

For More Information

Web: bio-rad.com/dna-cleanup and [/protein-cleanup](http://bio-rad.com/protein-cleanup)

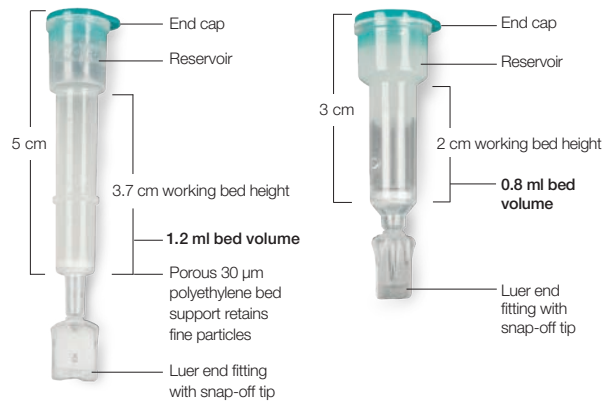
PCR Kleen Spin Columns

PCR Kleen columns are prepacked spin columns for purifying PCR products and other DNA molecules >200 bp directly from reaction mixtures. A simple 4-minute spin effectively removes salts, nucleotides, enzymes, primers, and primer-dimers. Purified DNA fragments are immediately available for secondary PCR, subcloning, restriction digests, ligations, sequencing, and other enzymatic manipulations.

For More Information

Web: bio-rad.com/dna-cleanup

Download bulletin: 2311



Prepacked Bio-Spin and Micro Bio-Spin Columns



PCR Kleen Spin Columns

Ordering Information

Catalog #	Description
Micro Bio-Spin Columns with Bio-Gel P-6 in Tris Buffer	
7326221	Micro Bio-Spin P-6 Columns, includes 25 columns in Tris buffer, 50 collection tubes
7326222	Micro Bio-Spin P-6 Columns, includes 100 columns in Tris buffer, 200 collection tubes
Micro Bio-Spin Columns with Bio-Gel P-30 in Tris Buffer	
7326223	Micro Bio-Spin P-30 Columns, includes 25 columns in Tris buffer, 50 collection tubes
7326224	Micro Bio-Spin P-30 Columns, includes 100 columns in Tris buffer, 200 collection tubes
7326250	Micro Bio-Spin P-30 Columns, includes 25 columns in Tris buffer, 50 collection tubes, RNase-free
7326251	Micro Bio-Spin P-30 Columns, includes 100 columns in Tris buffer, 200 collection tubes, RNase-free
Micro Bio-Spin Columns with Bio-Gel P-6 in SSC Buffer	
7326200	Micro Bio-Spin P-6 Columns, includes 25 columns in SSC buffer, 50 collection tubes
7326201	Micro Bio-Spin P-6 Columns, includes 100 columns in SSC buffer, 200 collection tubes
Micro Bio-Spin Columns with Bio-Gel P-30 in SSC Buffer	
7326202	Micro Bio-Spin P-30 Columns, includes 25 columns in SSC buffer, 50 collection tubes
7326203	Micro Bio-Spin P-30 Columns, includes 100 columns in SSC buffer, 200 collection tubes
Bio-Spin Columns with Bio-Gel P-6 in Tris Buffer	
7326227	Bio-Spin P-6 Columns, includes 25 columns in Tris buffer, 50 collection tubes
7326228	Bio-Spin P-6 Columns, includes 100 columns in Tris buffer, 200 collection tubes
Bio-Spin Columns with Bio-Gel P-30 in Tris Buffer	
7326231	Bio-Spin P-30 Columns, includes 25 columns in Tris buffer, 50 collection tubes
7326232	Bio-Spin P-30 Columns, includes 100 columns in Tris buffer, 200 collection tubes
Bio-Spin Columns with Bio-Gel P-6 in SSC Buffer	
7326002	Bio-Spin P-6 Columns, includes 25 columns in SSC buffer, 50 collection tubes
Bio-Spin Columns with Bio-Gel P-30 in SSC Buffer	
7326006	Bio-Spin P-30 Columns, includes 25 columns in SSC buffer, 50 collection tubes
PCR Kleen Spin Columns	
7326300	PCR Kleen Spin Columns, 25

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Sample Quantitation

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Protein Assay Kits

See Also

Microplate readers:
page 336.

Cuvettes: page 23.

Determining the concentration of protein samples is critical for many experiments, and most protein samples can be quantitated by a colorimetric assay. In a typical protein assay, a chemical reagent is added to a protein sample solution, producing a color change that is measured with a spectrophotometer or microplate reader and compared to a standard curve of known protein concentrations. Bio-Rad offers four protein assays, each with a unique set of advantages. All assays can be easily automated for large numbers of samples.

Bio-Rad offers four protein assays:

- **Quick Start Bradford protein assay** — the single-step method for determining protein concentration in solution
- **Bio-Rad protein assay** — for quantitating most proteins and polypeptides with MWs >3,000
- **DC protein assay** — for use with samples containing detergent
- **RC DC protein assay** — for complex sample solutions containing reducing agents and detergents

For More Information

Web: bio-rad.com/proteinassays

Download bulletins: 1069, 6835, 6836, 6837, 6838, and 6852

Protein Assay Selection Guide*

	Quick Start Bradford	Bio-Rad	DC	RC DC
Application	Single-step method	Quantitates most proteins	For samples with detergent	For complex samples with reductants and detergents
Method adapted from	Bradford (1976)	Bradford (1976)	Lowry et al. (1951)	Lowry et al. (1951)
Standard-concentration assay				
Sample volume	100 μ l	100 μ l	100 μ l	100 μ l
Linear range	0.125–1.5 mg/ml	0.125–1.5 mg/ml	0.125–1.5 mg/ml	0.2–1.5 mg/ml
Low-concentration assay				
Sample volume	1 ml	800 μ l	200 μ l	200 μ l
Linear range	1.25–25 μ g/ml	1.25–25 μ g/ml	5–250 μ g/ml	5–250 μ g/ml
Microplate assay sample volume	5 μ l	10 μ l	5 μ l	**
Minimum incubation time	5 min	5 min	15 min	15 min
Assay wavelength	595 nm	595 nm	650–750 nm	650–750 nm

* Standard-concentration assay is designed for smaller sample volumes of higher protein concentration, while the low-concentration assay is designed for larger sample volumes of lower protein concentration.

** To adapt the RC DC assay to a microplate format, follow the micro test tube (microfuge tube) assay protocol in the RC DC protein assay instruction manual up to the centrifugation step where the supernatant is discarded. The pellet can then be transferred to the microplate, and the microplate assay protocol in the DC protein assay instruction manual can be followed.

Quick Start Bradford Protein Assay

The Quick Start Bradford protein assay is a streamlined, accurate procedure for determining the concentration of protein in solution. Ready-to-use dye reagent and prediluted protein standards allow one-step determination of protein concentration.

Quick Start Bradford kits offer either bovine serum albumin or bovine γ -globulin standard sets. Each kit contains two aliquots each of seven concentrations (0.125, 0.25, 0.5, 0.75, 1.0, 1.5, and 2.0 mg/ml) conveniently packaged in screwcap vials, eliminating ampoules and ensuring protein stability for one year when stored at 4°C. Standards are also available in five 2 mg/ml aliquots for creating your own dilutions.

The 1x dye reagent can be used for performing 1 and 5 ml standard assays, microplate assays, or microassays.



For More Information

Web: bio-rad.com/quickstart

Download bulletins: 1069, 2969, 6835, and 6852

bio-rad.com/proteinassays

Ordering Information

Catalog #	Description
5000201	Quick Start Bradford Protein Assay Kit 1 , includes 1x dye reagent (1 L), bovine serum albumin standard (5 x 2 mg/ml); sufficient for 200 standard assays or 4,000 microplate assays
5000202	Quick Start Bradford Protein Assay Kit 2 , includes 1x dye reagent (1 L), bovine serum albumin standard set (2 sets of 7 concentration standards, 0.125–2.0 mg/ml, 2 ml)
5000204	Quick Start Bradford Protein Assay Kit 4 , includes 1x dye reagent (1 L), bovine γ -globulin standard set (2 sets of 7 concentration standards, 0.125–2.0 mg/ml, 2 ml)

Reagents

5000205	Quick Start Bradford 1x Dye Reagent , 1 L
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Accessories

5000206	Quick Start Bovine Serum Albumin Standard , 5 x 2 ml vials of 2 mg/ml
5000207	Quick Start Bovine Serum Albumin Standard Set , 2 sets of 7 concentration standards, 0.125–2.0 mg/ml
5000208	Quick Start Bovine γ-Globulin Standard , 5 x 2 ml vials of 2 mg/ml
5000209	Quick Start Bovine γ-Globulin Standard Set , 2 sets of 7 concentration standards, 0.125–2.0 mg/ml

Bio-Rad Protein Assay

The Bio-Rad protein assay is a simple colorimetric assay for determining total protein concentration. It is easy to adapt the assay from the standard-concentration range to a low-concentration microassay or for use in 96-well microplates for rapid determinations.

The Bio-Rad protein assay is based on the Bradford dye-binding procedure (Bradford 1976), which measures the color change of Coomassie Brilliant Blue G-250 dye when it binds to protein (primarily to basic and aromatic amino acid residues). The assay quantitates most proteins and polypeptides with MWs >3,000. Some detergents and basic buffers interfere with the assay.

For More Information

Web: bio-rad.com/BRprotein

Download bulletins: 1069, 1123, 6836, and 6852



Ordering Information

Catalog #	Description
5000001	Bio-Rad Protein Assay Kit I , includes 450 ml dye reagent concentrate, bovine γ -globulin standard; sufficient for 440 standard assays or 2,200 microplate assays
5000002	Bio-Rad Protein Assay Kit II , includes 450 ml dye reagent concentrate, bovine serum albumin standard; sufficient for 440 standard assays or 2,200 microplate assays

Reagents

5000006	Bio-Rad Protein Assay Dye Reagent Concentrate , 450 ml
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Accessories

5000005	Protein Standard I , bovine γ -globulin, reconstituted volume 20 ml
5000007	Protein Standard II , bovine serum albumin, reconstituted volume 20 ml

DC Protein Assay

The *DC* (detergent compatible) protein assay is a colorimetric assay for protein determination of samples that contain detergents. The reaction is similar to the well-documented Lowry assay (Lowry et al. 1951), but has been modified to save time. The *DC* protein assay requires only a single 15 minute incubation, and the absorbance readings are stable for at least 2 hours.

For More Information

Web: bio-rad.com/DCprotein

Download bulletins: 1069, 1731, 1770, 1909, 6837, and 6852



Ordering Information

Catalog #	Description
5000111	DC Protein Assay Kit I , includes 250 ml alkaline copper tartrate solution, 2 L dilute Folin reagent, 5 ml surfactant solution, bovine γ -globulin standard; sufficient for 450 standard assays
5000112	DC Protein Assay Kit II , includes 250 ml alkaline copper tartrate solution, 2 L dilute Folin reagent, 5 ml surfactant solution, bovine serum albumin standard; sufficient for 450 standard assays

Reagents

5000113	Protein Assay Reagent A , 250 ml, alkaline copper tartrate solution
5000114	Protein Assay Reagent B , 1 L, dilute Folin reagent
5000115	Protein Assay Reagent S , 5 ml, surfactant solution
5000116	DC Protein Assay Reagents Package , includes 250 ml alkaline copper tartrate solution, 2 L dilute Folin reagent, 5 ml surfactant solution; sufficient for 450 standard assays

Accessories

5000005	Protein Standard I , bovine γ -globulin, lyophilized (reconstituted volume 20 ml)
5000007	Protein Standard II , bovine serum albumin, lyophilized (reconstituted volume 20 ml)

See Also

Protein sample preparation: page 2.
Cuvettes: page 23.

RC DC Protein Assay

The *RC DC* (reducing agent and detergent compatible) protein assay is a colorimetric assay for protein determination in the presence of reducing agents and detergents. The *RC DC* protein assay, based on the Lowry protocol (Lowry et al. 1951), includes the features of the original *DC* protein assay. Its compatibility with a broader range of reagents allows simplified protein quantitation directly in complex sample solutions.

For More Information

Web: bio-rad.com/RCDprotein

Download bulletins: 1069, 2610, 6838, and 6852



Ordering Information

Catalog #	Description
5000121	RC DC Protein Assay Kit I , includes RC reagents package, DC protein assay reagents package, bovine γ -globulin standard; sufficient for 450 standard assays
5000122	RC DC Protein Assay Kit II , includes RC reagents package, DC protein assay reagents package, bovine serum albumin standard; sufficient for 450 standard assays
Reagents	
5000113	Protein Assay Reagent A , 250 ml, alkaline copper tartrate solution
5000114	Protein Assay Reagent B , 1 L, dilute Folin reagent
5000115	Protein Assay Reagent S , 5 ml, surfactant solution
5000116	DC Protein Assay Reagents Package , includes 250 ml alkaline copper tartrate solution, 2 L dilute Folin reagent, 5 ml surfactant solution; sufficient for 450 standard assays
5000120	RC DC Protein Assay Reagents Package , includes RC reagents package and DC protein assay reagents package; sufficient for 450 standard assays
5000119	RC Reagents Package , includes RC reagent I (250 ml) and RC reagent II (250 ml); sufficient for 500 standard assays
Accessories	
5000005	Protein Standard I , bovine γ -globulin, lyophilized (reconstituted volume 20 ml)
5000007	Protein Standard II , bovine serum albumin, lyophilized (reconstituted volume 20 ml)

Cuvettes

Bio-Rad offers quartz and plastic cuvettes in a range of working volumes.

For More Information

Web: bio-rad.com/assaycuvettes

See Also

Protein assay kits: page 20.

Standard and Semimicrovolume Cuvettes

Polystyrene cuvettes are ideal for use with protein assays (pages 20–22). They adsorb less Coomassie Blue dye than glass or quartz cuvettes. Assays can be mixed directly in the standard 3.5 ml cuvettes, and the volume of reagents can be reduced, yielding more assays per kit. Semimicrovolume 1.5 ml cuvettes are ideal for precise quantitation of small-volume samples. Both standard and semimicrovolume cuvettes are sized to fit most spectrophotometers. Bio-Rad cuvettes offer smooth optical surfaces for consistent and accurate readings.

Bio-Rad also offers other cuvettes for specialized applications, including quartz and disposable cuvettes.

For More Information

Web: bio-rad.com/assaycuvettes



Cuvette Racks

Ordering Information

Catalog # Description

Disposable Polystyrene Cuvettes

2239950 **Standard Disposable Polystyrene Cuvettes**, 3.5 ml, 100
 2239955 **Semimicrovolume Disposable Polystyrene Cuvettes**, 1.5 ml, 100

Quartz Cuvettes

1702502 **Standard Cuvette**, 1–3.5 ml, 10 mm path length, quartz
 1702503 **Semimicrovolume Cuvette**, 0.5–1.4 ml, 10 mm path length, quartz
 1702504 **Microvolume Cuvette**, 200–700 μ l, 10 mm path length, quartz
 1702505 **Submicrovolume Cuvette**, 80–100 μ l, 10 mm path length, quartz

VersaFluor Disposable Cuvettes and Cuvette Racks

1702415 **Standard Cuvettes**, 12.5 x 12.5 mm (outside dimensions), 4-sided, optically clear polystyrene, 3.5 ml, 100
 1702416 **Microcuvettes**, 3.0 x 3.0 mm (outside dimensions), 4-sided, optically clear polystyrene, 150–350 μ l, 100
 1660485 **Cuvette Racks**, hold 12 cuvettes each, set of 5

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Standard and Semimicrovolume Cuvettes, 23





Cell Counting



Automated Cell Counting System

TC20 Automated Cell Counter

With its innovative auto-focus and sophisticated cell counting algorithm, the TC20 automated cell counter eliminates subjectivity while delivering reliable counts of mammalian cells in 30 seconds.

- **Compatible with a broad range of cell sizes and types** — counts cell lines, primary cells (from tissue or blood), and stem cells
- **Innovative auto-focus technology** — removes the variation associated with manual focusing and leads to precise cell counts in 30 sec
- **Cell size gates** — user selects a population of interest in complex samples, such as primary cells, or lets the cell counting algorithm do all the work
- **Cell viability** — analyzes cells accurately using multifocal plane analysis
- **Easy to archive and analyze** — stores up to 100 counts in the onboard memory for access any time, or use the optional TC20 data analyzer software on your PC to further analyze exported cell images

Upon insertion of a counting slide, the TC20 provides a total cell count with or without staining and assesses cell viability via trypan blue exclusion. To determine if a cell is viable, the TC20 counter analyzes each cell on images acquired from multiple focal planes during the focusing step. Auto-focus and multifocal plane analysis reduce counting bias associated with manual focusing.

Accuracy is comparable to results obtained with a hemocytometer. The TC20 counter can count cells with a 6–50 μm cell diameter and within a broad concentration range of 5×10^4 – 1×10^7 cells/ml, which eliminates the need to dilute cells, thus reducing the errors associated with sample dilutions prior to counting.

For complex samples composed of multiple cell populations, such as primary cells, the position of cell size gates can be adjusted to define the population of interest.

Results from 100 previous counts are stored in the TC20 cell counter and can be exported via the USB port. Images of cells can be further analyzed on a computer using the TC20 data analyzer software.

For More Information

Web: bio-rad.com/TC20

Request or download bulletins: 6282 and 6283

 **Learn More about the Technology**
Web: bio-rad.com/tech/cellcounting



TC20 Automated Cell Counter, Counting Slides, and Trypan Blue

Ordering Information

Catalog #	Description
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TC20 Automated Cell Counter

1450102	TC20 Automated Cell Counter , 120–240 V, includes instrument, power supply, USB flash drive, 30 dual-chamber counting slides (60 counts), 1.5 ml trypan blue
1450103	TC20 Automated Cell Counter with Thermal Label Printer , 120–240 V, includes instrument, power supply, USB flash drive, USB cable, thermal label printer, 1 roll of 500 labels, 30 dual-chamber counting slides (60 counts), 1.5 ml trypan blue

Kits and Reagents*

1450003	Counting Kit , includes 30 dual-chamber counting slides (60 counts), 1.5 ml trypan blue
1450013	Trypan Blue , 0.4% in 0.81% sodium chloride and 0.06% potassium phosphate dibasic solution, sterile filtered, sufficient for 150 counts (10 µl/count), 1 x 1.5 ml
1450021	Trypan Blue , 0.4% in 0.81% sodium chloride and 0.06% potassium phosphate dibasic solution, sterile filtered, sufficient for 750 counts (10 µl/count), 5 x 1.5 ml
1450022	Trypan Blue , 0.4% in 0.81% sodium chloride and 0.06% potassium phosphate dibasic solution, sterile filtered, sufficient for 1,500 counts (10 µl/count), 10 x 1.5 ml
1450015	Counting Slides , 150 dual-chamber counting slides (300 counts)
1450016	Counting Slides , 300 dual-chamber counting slides (600 counts)
1450017	Counting Slides , 600 dual-chamber counting slides (1,200 counts)
1450018	Counting Slides , 900 dual-chamber counting slides (1,800 counts)
1450019	Counting Slides , 1,200 dual-chamber counting slides (2,400 counts)
1450020	Counting Slides , 2,400 dual-chamber counting slides (4,800 counts)
1450014	System Test Kit , includes verification slide, instructions

Accessories*

1450005	Thermal Label Printer , 120–240 V, includes thermal label printer, USB cable, 1 roll of 500 labels
1450007	Thermal Printer Labels , 1 roll of 500 labels, for thermal label printer

* Compatible with TC20 and TC10 automated cell counters.





Flow Cytometry

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Cell Sorting

Cell sorting provides a method, typically using fluorescence, to sort or isolate a homogenous population of cells from a heterogeneous mixture of cells based on intracellular and/or extracellular properties. Expressed fluorescent proteins, such as green fluorescent protein (GFP), or fluorophores conjugated to antibodies bind to markers of interest, which allows for a starting population to be sorted to greater than 99% purity. While cell sorting is commonly used in fields such as immunology, cancer biology, and stem cell biology, it is quickly becoming a useful tool in broader research studies from microbiology to neuroscience. Cell sorting can also be used as an upstream tool for proteomic or genomic experiments to achieve more specific results by reducing background noise or false positives.

Instruments

See Also

S3e Biosafety System Class I: page 35.

Cell sorting consumables: page 37.

Cell biology reagents: page 48.

Cell counting: page 27.

S3e Cell Sorter

The S3e cell sorter is the first truly walk-away automated cell sorter available to scientists. The S3e is a compact cell sorter equipped with one, two, or three lasers and up to four fluorescence detectors plus forward and side scatter detection. The cell sorter utilizes established jet-in-air technology in which cells are analyzed directly within the stream before being sorted. Samples can be sorted at high speeds while sensitivity and purity are maintained.

With its unique feature set and technical ease of use, the automated S3e cell sorter allows you to perform one to four color sorts in less than 30 minutes in your laboratory and greatly enhances your experimental success.

- Utilizes stream-in-air fluid dynamics for a more gentle high-speed sort
- Features Lossless Cell Sorting mode for maximum recovery of target cell populations from your precious samples
- Has simplified instrument setup and the intuitive software ensures user success, regardless of experience level
- Features a compact design (W x D x H: 70 x 65 x 65 cm) that includes onboard fluidics and temperature control systems
- Provides sort status email and text notifications, which allow the user to multitask during a sort

For More Information

Web: bio-rad.com/cellsorter

Download bulletin: #10032007

Request or download bulletin: 6614



S3e Cell Sorter System

Features

Performance	Droplet frequency	37–43 kHz	
	Sorting type	True jet-in-air for high-performance sorting	
	Sorting rate	No hardware limitations for sort rate, limited only by droplet frequency and application	
	Sorting purity	>99% pure	
	Sensitivity	<125 MESF for FITC and PE	
	Temperature control	Sample and collection temperature control from 4–37°C using Peltier solid-state system	
Lasers/Optics	One-laser system	Primary: 488 nm 100 mW	
	Two-laser system	Primary: 488 nm 100 mW Secondary: 405 nm 100 mW, 561 nm 100 mW, or 640 nm 100 mW	
	Three-laser system*	Primary: 405 nm 100 mW or 488 nm 100 mW Secondary: 561 nm 100 mW or 640 nm 100 mW Tertiary: 561 nm 100 mW or 640 nm 100 mW	
	Detectors	Forward scatter (FSC) with photomultiplier tube (PMT) Side scatter (SSC) with PMT 2 fluorescence detectors with PMT (one laser) 4 fluorescence detectors with PMT (two lasers)	
	Filters (488 laser)	Long pass: 495DLP, 560DLP, 540LP Band pass: 488/6, 525/30	
	Filters (488/561 lasers)	Long pass: 495DLP, 560DLP, 593DLP, 655LP Band pass: 488/6, 525/30, 615/25, 586/25	
	Filters (488/640 lasers)	Long pass: 495DLP, 560DLP, 640DLP, 700LP Band pass: 488/6, 526/48, 593/40, 670/30, 700LP	
	Filters (405/488/561 lasers)	Long pass: 470DSP, 495DLP, 560LP, 593LP, 600LP Band pass: 447/60, 488/6, 525/30, 586/25	
	Filters (405/488/640 lasers)	Long pass: 475DSP, 495DLP, 560DLP, 640LP, 650LP Band pass: 447/60, 488/6, 526/48, 593/40	
	Filters (488/561/640 lasers)	Long pass: 495DLP, 560DLP, 593DLP, 640DLP, 655LP Band pass: 488/6, 525/30, 586/25, 615/25	
	Fluidics	Nozzle	100 µm fixed
		Pressure	30 psi fixed
Sheath		Onboard dilution of 8x sheath fluid or direct use of 1x sheath fluid	
Minimum sample loading		200 µl	
Sorting	Directions	Two way	
	Mode	Single, purity, enrichment	
	Collection	Up to 5 x 5 ml sample tubes each direction Up to 5 x 1.5 ml tubes each direction Microscope slides 8-well strip each direction	
Physical Specifications	Dimensions (W x D x H)	70 x 65 x 65 cm (instrument only)	
	Weight	90 kg (instrument only)	

* Note that 405/561/640 nm option is not available.

See Also

ProLine rainbow beads: page 37.
ProFlow sort grade 8x sheath fluid: page 38.
S3e fluidic container: page 39.

Ordering Information

Catalog # Description

S3e Cell Sorter

1451005	S3e Cell Sorter (488 nm) , 488 nm 100 mW laser, includes 2 fluorescence detectors with filters, AutoGimbal system, ProSort software
1451006	S3e Cell Sorter (488/561 nm) , 488 and 561 nm 100 mW lasers, includes 4 fluorescence detectors with filters, AutoGimbal system, ProSort software
1451008	S3e Cell Sorter (488/640 nm) , 488 and 640 nm 100 mW lasers, includes 4 fluorescence detectors with filters, AutoGimbal system, ProSort software
12007058	S3e Cell Sorter (405/488/561 nm) , 405, 488, and 561 nm 100 mW lasers, includes 4 fluorescence detectors with filters, AutoGimbal system, ProSort software
12007059	S3e Cell Sorter (405/488/640 nm) , 405, 488, and 640 nm 100 mW lasers, includes 4 fluorescence detectors with filters, AutoGimbal system, ProSort software
12007052	S3e Cell Sorter (488/561/640 nm) , 488, 561, and 640 nm 100 mW lasers, includes 4 fluorescence detectors with filters, AutoGimbal system, ProSort software
1451078	S3e Biosafety System Class I
1451029	S3e Cell Sorter (488 nm) with S3e Biosafety System Class I
1451030	S3e Cell Sorter (488/561 nm) with S3e Biosafety System Class I
1451032	S3e Cell Sorter (488/640 nm) with S3e Biosafety System Class I
17003806	S3e Cell Sorter (405/488/561 nm) with S3e Biosafety System Class I
17003807	S3e Cell Sorter (405/488/640 nm) with S3e Biosafety System Class I
17003808	S3e Cell Sorter (488/561/640 nm) with S3e Biosafety System Class I

S3e Cell Sorter Laser Upgrade Package

12007053	405 nm Laser Upgrade for S3e Cell Sorter (488/561 nm)
12007054	640 nm Laser Upgrade for S3e Cell Sorter (488/561 nm)
12007055	405 nm Laser Upgrade for S3e Cell Sorter (488/640 nm)
12007056	561 nm Laser Upgrade for S3e Cell Sorter (488/640 nm)

Accessories

1441001	S3e Sheath Cap Assembly , white
1441002	S3e DI Water Cap Assembly , blue
1441003	S3e Waste Cap Assembly , red
1441005	S3e Filter Block A , empty with 2 dichroic filter holders
1441006	S3e Filter Block B , empty with 2 dichroic filter holders
1441007	S3e Individual Filter Holder , black, empty
1441008	Neutral Density Filter , optical density 1.0
1441009	S3e Nozzle Tip , 100 µm
1441010	S3e Nozzle O-Ring with Alignment Disk , pkg of 2
1441011	S3e Collection Adaptor Set
1441012	Hex Driver , 2 mm
1441013	S3e Individual Dichroic Filter Holder , empty
1451076	S3e Power Conditioner , international
1451077	S3e Power Conditioner , U.S.
1451065	S3e Cell Sorter Accessory Kit , includes 100 µm nozzle tip, 2 nozzle O-rings, 2 nozzle alignment disks, 1 ml syringe, 2 neutral density filters (1.0), 2 mm hex driver, spanner wrench
1451086	ProLine Universal Calibration Beads , includes 3 x 5 ml bottles of ready-to-use beads for alignment verification and drop delay determination on the S3e cell sorter
1451082	ProFlow Sort Grade 8x Sheath Fluid , includes 5 x 4 L ready-to-use, sterile, preservative-free phosphate buffered saline (PBS) solutions in gamma-irradiated S3e fluidic containers
1451083	ProFlow Sort Grade Water , includes 5 x 4 L sterile, endotoxin-free water in gamma-irradiated S3e fluidic containers
1451084	S3e Fluidic Container , 3 x 4 L gamma-irradiated sterile containers for use on the S3 or S3e cell sorter
1451085	ProLine Rainbow Beads , includes a 5 ml bottle containing a mixture of beads dyed with 8 different fluorescence intensities for excitation at wavelengths between 365–650 nm

S3e Biosafety System Class I

The S3e Biosafety System Class I is an aerosol containment hood custom designed for the S3 or S3e cell sorter, which provides users and the environment protection from aerosols created during the cell sorting process. It is an affordable alternative to traditional large and expensive biosafety hoods commonly offered for cell sorters.

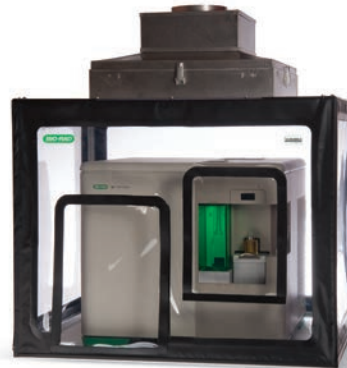
The S3e Biosafety System Class I sits directly on the benchtop and contains the compact S3 or S3e cell sorter. Its easy-to-open, magnetically attached vinyl walls provide ready access to all sides of the cell sorter during operation, cleaning and maintenance, or service.

Fully integrated with and monitored by the S3 or S3e cell sorter's ProSort software, users have real-time information about HEPA filter life and the temperature of the system inside. Fan speed is determined based on the cell sorter operation mode — sorting or idle. The HEPA filter provides protection at 99.997% for 0.3 µm particles. The system is able to perform a 100% air exchange six to eight times per minute around the S3 or S3e cell sorter.

The system adheres to the biosafety requirements of the International Society for Advancement of Cytometry (ISAC) for aerosol containment.

Product features include:

- **Compact and affordable** — small footprint for an economical alternative to large and expensive traditional biosafety hoods



- **Software controlled** — full integration with ProSort software for fan speed regulation and temperature monitoring in real time
- **Fully accessible** — easily opened vinyl walls are magnetically attached, allowing access to all 4 sides of the cell sorter for cleaning and maintenance
- **Quiet and energy efficient** — generates low vibration and sound pressure levels; specialized fans and low backpressure from the HEPA filter reduce energy consumption

For More Information

Web: bio-rad.com/S3eBiosafetyMore

Download bulletin: 6404

Request or download bulletin: 6503

Ordering Information

Catalog #	Description
1451005	S3e Cell Sorter (488 nm) , 488 nm 100 mW laser, includes 2 fluorescence detectors with filters, AutoGimbal system, ProSort software
1451006	S3e Cell Sorter (488/561 nm) , 488 and 561 nm 100 mW lasers, includes 4 fluorescence detectors with filters, AutoGimbal system, ProSort software
1451008	S3e Cell Sorter (488/640 nm) , 488 and 640 nm 100 mW lasers, includes 4 fluorescence detectors with filters, AutoGimbal system, ProSort software
12007058	S3e Cell Sorter (405/488/561 nm) , 405, 488, and 561 nm 100 mW lasers, includes 4 fluorescence detectors with filters, AutoGimbal system, ProSort software
12007059	S3e Cell Sorter (405/488/640 nm) , 405, 488, and 640 nm 100 mW lasers, includes 4 fluorescence detectors with filters, AutoGimbal system, ProSort software
12007052	S3e Cell Sorter (488/561/640 nm) , 488, 561, and 640 nm 100 mW lasers, includes 4 fluorescence detectors with filters, AutoGimbal system, ProSort software
1451078	S3e Biosafety System Class I
1451029	S3e Cell Sorter (488 nm) with S3e Biosafety System Class I
1451030	S3e Cell Sorter (488/561 nm) with S3e Biosafety System Class I
1451032	S3e Cell Sorter (488/640 nm) with S3e Biosafety System Class I
17003806	S3e Cell Sorter (405/488/561 nm) with S3e Biosafety System Class I
17003807	S3e Cell Sorter (405/488/640 nm) with S3e Biosafety System Class I
17003808	S3e Cell Sorter (488/561/640 nm) with S3e Biosafety System Class I
1451076	S3e Power Conditioner , international
1451077	S3e Power Conditioner , U.S.

S3e Cell Sorter IQ/OQ Services

Installation qualification (IQ) and operational qualification (OQ) services for the S3e cell sorter ensure that your system functions properly and aids in regulatory compliance. Both services are completed by a certified service engineer.

IQ services include a careful inspection and documentation of instrument installation. The engineer ensures that the instrument is properly installed, inspects vital system components, and documents details about the computer software and vital system components.

OQ services verify and document that the instrument is performing according to the manufacturer's specifications. The thorough evaluation includes documentation of essential system information, evaluation of all key system components, complete instrument verification, service system testing, manual and bead-based testing, and signed documentation of the completion of the IQ/OQ services.

- **Maximize instrument uptime** — planned instrument qualification services ensure your instrument is performing according to specifications
- **Increase your confidence** — frequent instrument validation helps minimize loss of precious samples and valuable time associated with a malfunctioning instrument
- **Remain compliant** — official documentation can aid in meeting regulatory requirements

For More Information

Web: bio-rad.com/flowiqoq

Ordering Information

Catalog #	Description
12005873	S3e Cell Sorter IQ/OQ Kit , includes IQ and OQ protocols, test reagents, and accessories

Consumables

ProLine Universal Calibration Beads

ProLine universal calibration beads are designed to verify the alignment performance and determine the drop delay on any S3 or S3e cell sorter. Each bottle contains a single population of ready-to-use fluorescent beads for a total of 30 quality control (QC) tests.

Product features include:

- Ready-to-use fluorescent beads do not require dilution
- Alignment and drop delay can be performed with 1 reagent in less than 7 min
- Pass/fail performance result with ProSort software
- Trending QC information in ProSort software for tracking the performance of your S3 or S3e cell sorter



For More Information

Web: bio-rad.com/prolineuniversal
Download bulletin: #10041517
Request or download bulletin: 6614

Ordering Information

Catalog #	Description
1451086	ProLine Universal Calibration Beads, 15 ml (3 x 5 ml)

ProLine Rainbow Beads

ProLine rainbow beads are designed for instrument performance monitoring on a flow cytometer system. Each bottle contains 3.0–3.4 μm beads dyed with eight different fluorescent intensities for excitation by lasers between 365 and 650 nm.

- Easily check the sensitivity and linearity of your flow cytometer with one set of beads
- Track fluorescent fluctuations with validated bead lots to ensure accurate baselines
- Use with either the S3e cell sorter or the ZE5 cell analyzer



For More Information

Web: bio-rad.com/prolinerainbowbeads
Download bulletin: #10033040

Ordering Information

Catalog #	Description
1451085	ProLine Rainbow Beads, includes a 5 ml bottle containing a mixture of beads dyed with 8 different fluorescent intensities for excitation at wavelengths 365–650 nm

See Also

ProFlow sort grade 8x sheath fluid: page 38.
ProFlow sort grade water: page 39.
S3e fluidic container: page 39.

See Also

ProLine universal calibration beads: page 37.

ProLine rainbow beads: page 37.

ProFlow sort grade water: page 39.

S3e fluidic container: page 39.

ProFlow Sort Grade 8x Sheath Fluid

ProFlow sort grade 8x sheath fluid is a ready-to-use, sterile, endotoxin- and preservative-free phosphate buffered saline solution. Each lot is tested for cytotoxicity and particulates and is bottled in gamma-irradiated containers to ensure sterility. Up to 5 weeks of run time is available per case when it is used on the S3 or S3e cell sorter. The S3 or S3e cell sorter employs its internal fluidics system to automatically dilute ProFlow sort grade 8x sheath fluid and creates 32 L of 1x sheath solution from each container, generating 160 L per case.



Product features include:

- **No manual dilution required** — the S3 and S3e cell sorters' unique internal fluidics chamber automatically generates a 1x solution, ensuring accurate dilution and minimizing potential contamination
- **Easy container swapping** — prepackaged, sterile S3e fluidic container bypasses the need to fill a new container during a sort, minimizing the risk of contamination
- **Minimum storage requirements** — one 20 L case creates 160 L of 1x sheath solution, freeing your storage space for other purposes

For More Information

Web: bio-rad.com/sheath

Download bulletin: #10030825

Request or download bulletin: 6614

Ordering Information

Catalog #	Description
1451082	ProFlow Sort Grade 8x Sheath Fluid, 20 L (5 x 4 L)

ProFlow Sort Grade Water

This sterile, endotoxin-free solution is ideal for flow cytometry instrumentation. ProFlow sort grade water is designed to provide the best sort results when combined with preservative-free ProFlow sort grade 8x sheath fluid on any S3 or S3e cell sorter. It may also be used on the ZE5 cell analyzer. Each lot is prepared by reverse osmosis, passed through fine carbon, deionized through two resin beds, serially filtered twice through 0.1 µm positively charged membranes, and poured into gamma-irradiated S3e fluidic containers.

For More Information

Web: bio-rad.com/proflowsortgradewater

Download bulletin: #10032248



See Also

ProLine universal calibration beads: page 37.

ProLine rainbow beads: page 37.

ProFlow sort grade 8x sheath fluid: page 38.

Ordering Information

Catalog #	Description
1451083	ProFlow Sort Grade Water , includes 5 x 4 L sterile, endotoxin-free water in gamma-irradiated S3e fluidic containers

S3e Fluidic Container

S3e fluidic containers are specifically designed for use on the S3 or S3e cell sorter. Easily store your solutions in the S3e fluidic containers for quick container swaps during a run. Each 4 L container is gamma irradiated to ensure sterility.

For More Information

Web: bio-rad.com/s3emore

Request or download bulletin: 6614



Ordering Information

Catalog #	Description
1451084	S3e Fluidic Container , 3 x 4 L gamma-irradiated sterile containers for use on the S3 or S3e cell sorter

Reagents

See Also

Cell biology reagents:
page 48.

Kits and Reagents for Cell Sorting

Bio-Rad offers a variety of easy-to-use kits and reagents suitable for use with the S3e cell sorter.

Ordering Information					
Catalog #	Description	Maximum Excitation, nm	Maximum Emission, nm	Optimal Excitation Laser, nm	S3e Cell Sorter Configuration
Antibody Labeling Kits					
1351011	ReadiLink 405/454	403	454	405	405 laser (447/60)
1351002	ReadiLink 492/516	492	516	488	488 laser FL1 (526/48) 488 laser FL1 (525/30)
1351003	ReadiLink 555/570	555	570	561	561 laser FL2 (586/25)
1351004	ReadiLink 594/610	594	610	561	561 laser FL3 (615/25)
1351005	ReadiLink 633/655	633	655	640	640 laser FL3 (670/30)
1351006	ReadiLink 647/674	647	674	640	640 laser FL3 (670/30)
1351007	ReadiLink 680/701	680	701	640	640 laser FL4 (700/LP)
1351008	ReadiLink 700/713	700	713	640	640 laser FL4 (700/LP)
Cell Proliferation					
1351202	CytoTrack Blue 403/454	403	454	405	405 laser (447/60)
1351203	CytoTrack Green 511/525	511	525	488	488 laser FL1 (525/30) 488 laser FL1 (526/48)
1351204	CytoTrack Yellow 542/556	542	556	532	488 laser FL2 (593/40)
1351205	CytoTrack Red 628/643	628	643	633 or 640	640 laser FL3 (640/30)
1351201	CFDA-SE Cell Proliferation Assay	492	517	488	488 laser FL1 (525/30) 488 laser FL1 (525/30)
Cell Viability					
1351112	VivaFix 410/450	410	450	405	405 laser (447/60)
1351113	VivaFix 408/512	408	512	405	405 laser (495 DLP, 525/30, 526/48)
1351114	VivaFix 398/550	398	550	405	405 laser (495 DLP)
1351115	VivaFix 498/521	498	521	488	488 laser FL1 (525/30)
1351116	VivaFix 547/573	547	573	561	561 laser FL2 (586/25)
1351117	VivaFix 583/603	583	603	561	561 laser FL3 (615/25)
1351118	VivaFix 649/660	649	660	640	640 laser FL3 (670/30)
1351101	Propidium Iodide	538	617	561 or 488	488 laser FL3 (615/25) 488 laser FL2 (540/LP) 488 laser FL2 (593/40) 561 laser FL3 (615/25)
1351102	7-AAD	548	648	561 or 488	488 laser FL4 (655/LP) 488 laser FL2 (540/LP) 488 laser FL3 (670/30) 561 laser FL4 (655/LP)

Cell Analysis

Cell analysis via flow cytometry examines the physical and chemical characteristics of particles in a fluid as it passes through at least one laser. Cell components are usually fluorescently labeled and then excited by the laser to emit light at varying wavelengths. Flow cytometry allows fast analysis at the single-cell level. Typical parameters include cell volume (forward scatter), morphological complexity (side scatter), pigments, DNA content, protein expression, cell surface and intracellular antigens, cytokines, apoptosis, cell viability, cell monitoring, and fluorescent proteins. Life science disciplines that utilize flow cytometry include immunology, cell biology, cancer research, plant biology, microbiology, pathology, marine biology, and medicine.

See Also

Cell biology reagents:
page 48.

Instruments

ZE5 Cell Analyzer

The ZE5 cell analyzer was created by gathering input from some of the leading flow cytometer users across the world and was designed to address the gaps in currently available systems.

It is an innovative flow cytometer with flexible configurations designed to meet a broad range of experimental complexities and throughput needs. With up to 30 detectors (27 colors), the ZE5 cell analyzer is a truly expandable flow cytometer. The fully integrated sample loader, with the ability to handle tubes or plates without changing instrument hardware, enables true walk-away functionality. Features such as the stat tube station, the fluid and reagent hot swap capability, and the automated startup and QC allow for continuous operation and maximize instrument running time for any busy core lab. With its API, the ZE5 cell analyzer can be integrated into any workcell for automated analysis. Its innovative sample delivery system ensures quick processing, reduced carryover, and minimal sample loss by returning unused precious cells to the sample plate or tube for later use.

Features include:

- Flexible loading options
- Best-in-class and scalable optics
- Integrated and easy-to-use fluidics
- Innovative electronics providing highest quality data
- High-throughput production
- Automation/robotics capability



Specifications

System	Fluorescence sensitivity	<100 MESF for FITC, PE, APC
	Scatter sensitivity	<0.3 μm FSC resolution with small particle detection module
	Loader	Integrated sample loader with agitation and temperature control. Up to 384-well plates; 40-tube rack for 5 ml 12 x 75 mm tube loading. Stat tube position for single tube loading
Optics	Excitation	Up to five spatially separated lasers per instrument. Standard options include: 355 nm, 50 mW 405 nm, 100 mW 561 nm, 50 mW 488 nm, 100 mW 640 nm, 100 mW
	Detection	Up to 30 detectors including FSC and SSC; optional second FSC detector
	Cuvette	Fused silica with 145 x 265 μm channel
Electronics	Speed	>100,000 events per second with all parameters enabled
	Data processing	Simultaneous measured peak, area, and width for every channel. 24-bit data for peak and area. 17-bit data for width with high-resolution linear interpolation at the half height.
Fluidics	Sample flow rates	0.0025–2.5 $\mu\text{l}/\text{sec}$
	Bulk fluids	4 x 4 L bulk fluid tanks on board for sheath and waste. On board additive concentrate and cleaner.
Installation	Power	95–240 VAC, 50–60 Hz, <500 W
	Dimensions (W x D x H)	29 x 27 x 26 in.; 74 x 69 x 66 cm
	Weight	<240 lb; <110 kg
	Temperature and humidity	18–25°C; 20–60% RH
	Air and vacuum supply	Included, on-board
Software	Operating system	Windows 7 Pro
	FCS format	FCS 3.1
	QC	Automated quality control with on-board calibration beads
	Workstation	Intel Core i7-7700 Quad Core; 3.3 GHz
Regulatory	CE, Class I (1) laser product	
	Research use only	

For More InformationWeb: bio-rad.com/ZE5

Request or download bulletin: 6814

Ordering Information

Catalog # Description

ZE5 Cell Analyzer

17002033	ZE5 Cell Analyzer , 3 laser 17 color (405/488/640)
17002034	ZE5 Cell Analyzer , 3 laser 17 color (488/561/640)
17002032	ZE5 Cell Analyzer , 4 laser 24 color (405/488/561/640)
17002031	ZE5 Cell Analyzer , 5 laser 27 color (355/405/488/561/640)

continues

Ordering Information

Catalog #	Description
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Accessories

12004403	ZE-Series QC Beads , 5 ml, pack of 3
1451085	ProLine Rainbow Beads , includes a 5 ml bottle containing a mixture of beads dyed with 8 different fluorescent intensities for excitation at wavelengths between 365–650 nm
12004271	ZE5 Additive , 4 x 300 ml
12004404	ZE5 Additive Bottle with Tubing , white, includes 450 ml bottle, cap/tubing assembly with filter and quick connector
12004272	Cytometer Cleaner , 1 L
12004395	ZE5 Cleaner Bottle with Tubing , blue, includes 450 ml bottle, cap/tubing assembly with filter and quick connector
12004444	ZE5 Cleaner/Additive Bottle , includes 2 x 450 ml bottles
1451083	ProFlow Sort Grade Water , includes 5 x 4 L sterile, endotoxin-free water in gamma-irradiated fluidic containers
12004397	ZE5 DI Water Container with Tubing , includes 4 L container, cap/tubing assembly with filters and quick connectors
12004396	ZE5 Waste Container with Tubing , includes 4 L container, cap/tubing assembly with filters and quick connectors
12004418	ZE5 DI Water Container , 4 L, pkg of 2
12004402	ZE5 Waste Container , 4 L, pkg of 2
12004274	5 ml Tubes , 12 x 75 mm with cap, sterile polypropylene, pack of 25
12004445	ZE5 Tube Rack , 5 ml size, 40 spots
12004446	ZE5 Tube Rack , 1.5 ml size, 24 spots

ZE5 Cell Analyzer IQ/OQ Services

Installation qualification (IQ) and operational qualification (OQ) services for the ZE5 cell analyzer ensure that your system functions properly and aids in regulatory compliance. Both services are completed by a certified service engineer.

IQ services include a careful inspection and documentation of instrument installation. The engineer ensures that the instrument is properly installed, inspects vital system components, and documents details about the computer software and vital system components.

OQ services verify and document that the instrument is performing according to the manufacturer's specifications. The thorough evaluation includes documentation of essential system information, evaluation of all key system components, complete instrument verification, service system testing, manual and bead-based testing, and signed documentation of the completion of the IQ/OQ services.

- **Maximize instrument uptime** — planned instrument qualification services ensure your instrument is performing according to specifications
- **Increase your confidence** — frequent instrument validation helps minimize loss of precious samples and valuable time associated with a malfunctioning instrument
- **Remain compliant** — official documentation can aid in meeting regulatory requirements

For More Information

Web: bio-rad.com/flowiqoq

Ordering Information

Catalog #	Description
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12005874	ZE5 Cell Analyzer IQ/OQ Kit , includes IQ and OQ protocols, test reagents, and accessories
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Instrument Upgrades

7 Detectors off 355 nm Laser Upgrade Kit

This upgrade kit expands experimental options by increasing the number of detectors off the 355 nm laser from five to seven.

Compatible systems: ZE5 systems with 5 lasers

For More Information

Web: bio-rad.com/ZE5

Option A	Seven Detectors	Fluorophores	Option B	Seven Detectors	Fluorophores
355 Laser	387/11	BUV395	355 Laser	387/11	BUV395
	439 DLP (changeable)			439 DLP (changeable)	
	509/24	BUV496, DAPI		460/22	DAPI
	560 DLP			493 DLP	
	577/15	BUV563		509/24	BUV496
	600 DLP (changeable)			530 DLP (changeable)	
	615/24	BUV615		577/15	BUV563
	640 DLP			640 DLP	
	670/30	BUV661		670/30	BUV661
	690 DLP			690 DLP	
	747/33	BUV737		747/33	BUV737
776 DLP (changeable)		776 DLP (changeable)			
780/LP	BUV805	780/LP	BUV805		

Ordering Information

Catalog #	Description
12009028	7 Detectors off 355 nm Laser Upgrade Kit, Option A
12009029	7 Detectors off 355 nm Laser Upgrade Kit, Option B

355 nm Laser Upgrade Kit for ZE5 Cell Analyzer

The UV (355 nm) laser addition is suitable for any ZE5 system without UV laser. It adds the 355 nm laser and bank with five detectors. Use this laser upgrade kit to expand your experimental options in research applications.

Compatible systems: any ZE5 system without a UV laser

For More Information

Web: bio-rad.com/ZE5

Ordering Information

Catalog #	Description
12009185	355 nm Laser Upgrade Kit for ZE5 Cell Analyzer

Everest Software Developer Kit (ZE5 Automation)

The Everest application program interface (API) and software development kit (SDK) allow the ZE5 cell analyzer to interface with existing automation systems.

- The ZE5 API is an industry-standard HTTP-based RESTful web service that is platform- and language-independent
- The ZE5 API solution provides all basic ZE5 functionality and many advanced features designed for automated environments

- It includes a fully functional API client test application, which demonstrates how automation scheduling clients can be implemented using status polling with a minimal amount of coding effort. Source code is included

For More Information
Web: bio-rad.com/ZE5

Ordering Information

Catalog #	Description
12009761	Everest Software Developer Kit (ZE5 Automation)

Small Particle Detector (SPD) Upgrade Kit (on 405 nm Laser)

This upgrade kit makes an SPD (secondary FSC detector off the 405 nm laser) available for 3 and 4 laser ZE5 systems with a 405 nm laser. Note: The SPD comes standard on the 5 laser ZE5 cell analyzer.

For More Information
Web: bio-rad.com/ZE5

Ordering Information

Catalog #	Description
12009372	Small Particle Detector (SPD) Upgrade Kit (on 405 nm Laser)

Large Capacity Fluidics Options

External fluidics connections reduce day-to-day fluidics maintenance and enable uninterrupted overnight runs in high-throughput and automation environments.

The following options are available:

- External house DI upgrade kit
- External DI water carboy and fluidics cart upgrade kit
- External waste carboy and fluidics cart

The external house DI water upgrade kit is suitable for laboratories with access to pressurized house DI water. It enables a connection between the ZE5 cell analyzer and the laboratory's source of pressurized house DI water.

Laboratories without pressurized house DI water can use the external DI water carboy and fluidics cart upgrade kit to increase the time the ZE5 cell analyzer can run unattended. It enables approximately 22 hours of uninterrupted run time. Liquids are hot swappable, and fluidics level warnings from Everest software inform users that fluidics need attention starting at 2 hours of remaining run time.

The external waste carboy and fluidics cart upgrade kit enables approximately 22 hours of unattended waste collection. Liquids are hot swappable.

For More Information
Web: bio-rad.com/ZE5

Ordering Information

Catalog #	Description
12009651	External House DI Water Upgrade Kit
12009707	ZE5 External DI Water Carboy and Fluidics Cart Upgrade Kit , includes external DI water fluidics cart, power supply, 20 L DI water carboy, and DI water carboy cap vented with integrated replaceable filter and leak-free quick disconnect
12009734	ZE5 External Waste Carboy and Fluidics Cart Upgrade Kit , includes external waste fluidics cart with power supply, waste carboy, and cap for ZE5 waste carboy with overflow sensor, leak-free quick disconnect, and filtered vent

Reagents

Kits and Reagents for Cell Analysis

Bio-Rad offers a variety of easy-to-use kits and reagents suitable for use with the ZE5 cell analyzer.

Ordering Information

Catalog #	Description	Maximum Excitation, nm	Maximum Emission, nm	Optimal Excitation Laser, nm	ZE5 Cell Analyzer Configuration
Antibody Labeling Kits					
1351011	ReadiLink 405/454	403	454	405	405 laser 460/22
1351002	ReadiLink 492/516	492	516	488	488 laser 525/35
1351003	ReadiLink 555/570	555	570	561	561 laser 577/15
1351004	ReadiLink 594/610	594	610	561	561 laser 615/24
1351005	ReadiLink 633/655	633	655	640	640 laser 670/30
1351006	ReadiLink 647/674	647	674	640	640 laser 670/30
1351007	ReadiLink 680/701	680	701	640	640 laser 720/60
1351008	ReadiLink 700/713	700	713	640	640 laser 720/60
Cell Proliferation					
1351202	CytoTrack Blue 403/454	403	454	405	405 laser 460/22
1351203	CytoTrack Green 511/525	511	525	488	488 laser 525/35
1351204	CytoTrack Yellow 542/556	542	556	532	561 laser 577/15
1351205	CytoTrack Red 628/643	628	643	633 or 640	640 laser 670/30
1351201	CFDA-SE Cell Proliferation Assay	492	517	488	488 laser 525/30
Cell Viability					
1351111	VivaFix 353/442	353	442	355	355 laser 447/60
1351112	VivaFix 410/450	410	450	405	405 laser 460/22
1351113	VivaFix 408/512	408	512	405	405 laser 525/50
1351114	VivaFix 398/550	398	550	405	405 laser 525/50
1351115	VivaFix 498/521	498	521	488	488 laser 525/35
1351116	VivaFix 547/573	547	573	561	561 laser 577/15
1351117	VivaFix 583/603	583	603	561	561 laser 615/24
1351118	VivaFix 649/660	649	660	640	640 laser 670/30
1351101	Propidium Iodide	538	617	355, 488, or 561	355 laser 670/30 488 laser 593/52 561 laser 615/24
1351102	7-AAD	548	648	488 or 561	488 laser 692/80 561 laser 640/20
Nuclear Dyes					
1351303	DAPI	359	461	355 or 405	355 laser 447/60 or 405 laser 460/22
1351304	Hoechst 33342	350	461	355	355 laser 447/60 or 670/30

Cell Biology Reagents

In addition to cell biology reagents on bio-rad.com, Bio-Rad offers a dedicated antibody website — bio-rad-antibodies.com — specifically designed to meet the unique needs of researchers who use antibodies. This website showcases the range of our more than 10,000 antibodies and related reagents suitable for flow cytometry, immunohistochemistry, immunofluorescence, western blotting, immunoprecipitation, and ELISA. The antibody range also includes the highly validated PrecisionAb antibodies for western blotting and covers key research areas such as immunology, cancer, veterinary immunology research, and cell biology.

Antibody Labeling Kits

See Also

Cell sorting consumables: page 37.
Cell counting: page 27.

ReadiLink Antibody Labeling Kits

The following products are available on bio-rad.com.

ReadiLink antibody labeling kits offer easy fluorescence conjugation in microscale volumes. Each kit provides all the essential components to perform two 50 µg conjugation reactions with primary antibodies. Available in a variety of excitation and emission wavelength combinations, the ReadiLink kits can be used to rapidly conjugate any antibody of interest for use in multicolor flow cytometry experiments.

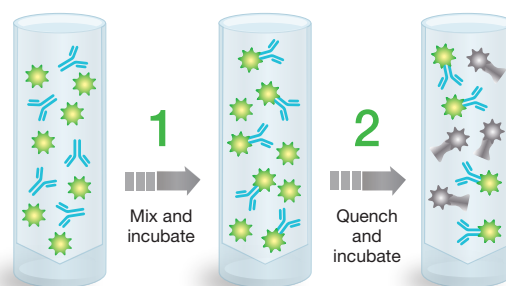
- Efficient two-step microgram antibody labeling
- Stable carboxamide bond with fluorescent dye
- Quench buffer eliminates background fluorescence

For More Information

Web: bio-rad.com/readilink1

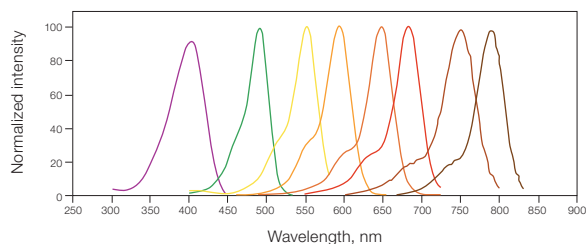
Download bulletin: #10033055

Request or download bulletin: 6523

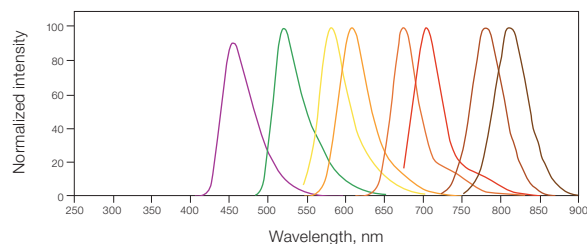


Quickly label your antibody of interest in two easy steps with ReadiLink antibody labeling kits.

- Antibody
- Dye
- Labeled antibody
- Quenched dye



Excitation wavelength spectrum. ReadiLink dyes 405/454 (-); 492/516 (-); 555/570 (-); 594/610 (-); 647/674 (-); 680/701 (-); 750/780 (-); 790/811 (-).



Emission wavelength spectrum. ReadiLink dyes 405/454 (-); 492/516 (-); 555/570 (-); 594/610 (-); 647/674 (-); 680/701 (-); 750/780 (-); 790/811 (-).

Ordering Information

Catalog #	Description	Fluorophore Equivalent	Maximum Excitation, nm	Maximum Emission, nm	Optimal Excitation Laser, nm	S3e Cell Sorter	ZE5 Cell Analyzer	ZOE Cell Imager
1351011	ReadiLink 405/454	Pacific Blue	403	454	405	•	•	
1351002	ReadiLink 492/516	FITC Alexa Fluor 488 DyLight 488	492	516	488	•	•	•
1351003	ReadiLink 555/570	Cy3 Alexa Fluor 555 DyLight 550	555	570	561	•	•	•
1351004	ReadiLink 594/610	Texas Red Alexa Fluor 594 DyLight 594	594	610	561	•	•	•
1351005	ReadiLink 633/655	Cy5 Alexa Fluor 633 DyLight 633	633	655	640	•	•	
1351006	ReadiLink 647/674	Cy5 Alexa Fluor 647 DyLight 650	647	674	640	•	•	
1351007	ReadiLink 680/701	Cy5.5 IRDye 700 Alexa Fluor 680 DyLight 680	680	701	640	•	•	
1351008	ReadiLink 700/713	Alexa Fluor 700	700	713	640	•	•	
1351009	ReadiLink 750/780	Alexa Fluor 750 DyLight 755	750	780	640		•	
1351010	ReadiLink 790/811	IRDye 800 Alexa Fluor 790 DyLight 800	790	811				

Each ReadiLink kit includes 2 vials of labeling dye, reaction buffer, and dye quench for labeling 2 x 50 µg of antibodies.

LYNX Conjugation Kits

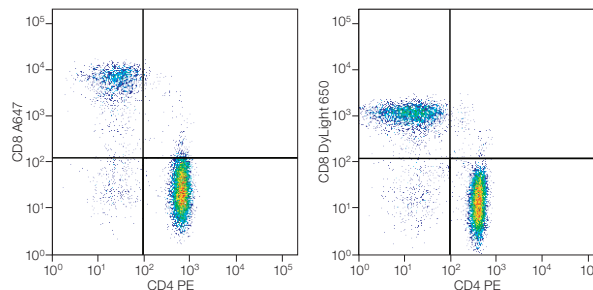
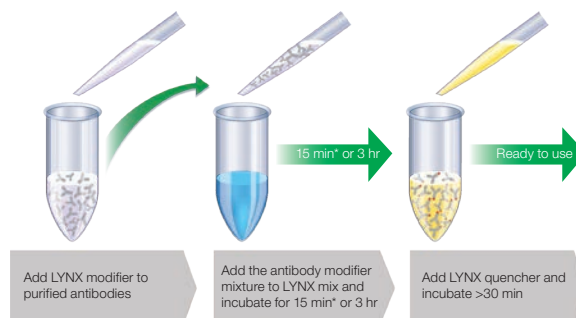


The following products are available on bio-rad-antibodies.com.

LYNX Rapid Conjugation Kit and LYNX Rapid Plus conjugation kits are available in a wide range of options, including common fluorophores, enzymes, and biotin/streptavidin conjugations. These kits are suitable for use in flow cytometry, enzyme-linked immunosorbent assay (ELISA), western blotting, immunohistochemistry, and immunofluorescence applications. Identical protocols for small-scale and large-scale conjugations allow conjugation of up to milligram quantities of antibody. Conjugate your antibodies in three easy steps with only 30 seconds hands-on time and no purification required.

- **Fast** — 1-step labeling procedure; requires 30 sec hands-on time, with an incubation time of either 15 min with the LYNX Rapid Plus kits or 3 hr with the LYNX Rapid kits to finish the conjugation
- **Simple** — can be used in the presence of up to 0.1% sodium azide and 0.5% bovine serum albumin
- **Instantly ready to use** — no additional columns or dialysis are required after the conjugation process is finished; the stable, high-quality labeled antibodies are ready to use
- **100% recovery** — no postconjugation cleanup required, which enables 100% yields of labeled antibodies. LYNX kits save time and eliminate batch-to-batch variation and loss of antibodies compared to traditional labeling methods
- **Easy scale-up** — same procedure is used for labeling small and large quantities of antibodies; users can initially conjugate micrograms of antibody for trial, then scale up to milligram quantities

For More Information
Web: bio-rad.com/lynxkits



Comparison of LYNX kits with directly conjugated antibodies.

Purified CD4 and CD8 T cells were labeled with LYNX Rapid RPE antibody conjugation kit (catalog #LNK021RPE) and LYNX Rapid Plus DyLight 650 antibody conjugation kit (#LNK241D650), respectively, and used to stain human peripheral blood. Alternatively, directly labeled antibodies were used. The staining shown is lymphocytes gated on the CD3 positive population. CD4 and CD8 positive T cells can be identified in both plots. Data acquired on the ZE5 cell analyzer. PE, phycoerythrin.

* LYNX Rapid Plus kits only.

Ordering Information

Catalog # Description

LYNX Rapid Conjugation Kits

LNK061F	LYNX Rapid Fluorescein Antibody Conjugation Kit, 3 conjugations for 200 µg antibody
LNK062F	LYNX Rapid Fluorescein Antibody Conjugation Kit, 1 conjugation for 2 mg antibody
LNK063F	LYNX Rapid Fluorescein Antibody Conjugation Kit, 3 conjugations for 20 µg antibody
LNK021RPE	LYNX Rapid RPE Antibody Conjugation Kit, 1 conjugation for 60 µg antibody
LNK022RPE	LYNX Rapid RPE Antibody Conjugation Kit, 3 conjugations for 60 µg antibody
LNK023RPE	LYNX Rapid RPE Antibody Conjugation Kit, 1 conjugation for 600 µg antibody
LNK024RPE	LYNX Rapid RPE Antibody Conjugation Kit, 3 conjugations for 10 µg antibody
LNK171PETR	LYNX Rapid RPE–Texas Red Antibody Conjugation Kit, 1 conjugation for 100 µg antibody
LNK172PETR	LYNX Rapid RPE–Texas Red Antibody Conjugation Kit, 3 conjugations for 100 µg antibody
LNK173PETR	LYNX Rapid RPE–Texas Red Antibody Conjugation Kit, 1 conjugation for 1 mg antibody
LNK174PETR	LYNX Rapid RPE–Texas Red Antibody Conjugation Kit, 3 conjugations for 10 µg antibody
LNK031APC	LYNX Rapid APC Antibody Conjugation Kit, 1 conjugation for 150 µg antibody
LNK032APC	LYNX Rapid APC Antibody Conjugation Kit, 3 conjugations for 150 µg antibody
LNK033APC	LYNX Rapid APC Antibody Conjugation Kit, 1 conjugation for 1.5 mg antibody
LNK034APC	LYNX Rapid APC Antibody Conjugation Kit, 3 conjugations for 10 µg antibody
LNK082C	LYNX Rapid RPE–Cy5 Antibody Conjugation Kit, 3 conjugations for 60 µg antibody
LNK084C	LYNX Rapid RPE–Cy5 Antibody Conjugation Kit, 3 conjugations for 10 µg antibody
LNK071PERCP	LYNX Rapid PerCP Antibody Conjugation Kit, 1 conjugation for 100 µg antibody
LNK072PERCP	LYNX Rapid PerCP Antibody Conjugation Kit, 3 conjugations for 100 µg antibody
LNK073PERCP	LYNX Rapid PerCP Antibody Conjugation Kit, 1 conjugation for 1 mg antibody
LNK141PERCPCY5.5	LYNX Rapid PerCP–Cy5.5 Antibody Conjugation Kit, 1 conjugation for 100 µg antibody
LNK142PERCPCY5.5	LYNX Rapid PerCP–Cy5.5 Antibody Conjugation Kit, 3 conjugations for 100 µg antibody
LNK143PERCPCY5.5	LYNX Rapid PerCP–Cy5.5 Antibody Conjugation Kit, 1 conjugation for 1 mg antibody
LNK144PERCPCY5.5	LYNX Rapid PerCP–Cy5.5 Antibody Conjugation Kit, 3 conjugations for 10 µg antibody
LNK092PECY5.5	LYNX Rapid RPE–Cy5.5 Antibody Conjugation Kit, 3 conjugations for 60 µg antibody
LNK094PECY5.5	LYNX Rapid RPE–Cy5.5 Antibody Conjugation Kit, 3 conjugations for 10 µg antibody
LNK131APCCY7	LYNX Rapid APC–Cy7 Antibody Conjugation Kit, 1 conjugation for 150 µg antibody
LNK132APCCY7	LYNX Rapid APC–Cy7 Antibody Conjugation Kit, 3 conjugations for 150 µg antibody
LNK133APCCY7	LYNX Rapid APC–Cy7 Antibody Conjugation Kit, 1 conjugation for 1.5 mg antibody
LNK134APCCY7	LYNX Rapid APC–Cy7 Antibody Conjugation Kit, 3 conjugations for 10 µg antibody
LNK111PECY7	LYNX Rapid RPE–Cy7 Antibody Conjugation Kit, 1 conjugation for 60 µg antibody
LNK112PECY7	LYNX Rapid RPE–Cy7 Antibody Conjugation Kit, 3 conjugations for 60 µg antibody
LNK113PECY7	LYNX Rapid RPE–Cy7 Antibody Conjugation Kit, 1 conjugation for 600 µg antibody
LNK114PECY7	LYNX Rapid RPE–Cy7 Antibody Conjugation Kit, 3 conjugations for 10 µg antibody

LYNX Rapid Plus Conjugation Kits

LNK221D488	LYNX Rapid Plus DyLight 488 Antibody Conjugation Kit, 3 conjugations for 200 µg antibody
LNK222D488	LYNX Rapid Plus DyLight 488 Antibody Conjugation Kit, 1 conjugation for 2 mg antibody
LNK223D488	LYNX Rapid Plus DyLight 488 Antibody Conjugation Kit, 3 conjugations for 20 µg antibody
LNK201CY3	LYNX Rapid Plus Cy3 Antibody Conjugation Kit, 3 conjugations for 200 µg antibody
LNK203CY3	LYNX Rapid Plus Cy3 Antibody Conjugation Kit, 3 conjugations for 20 µg antibody
LNK251RHO	LYNX Rapid Plus Rhodamine Antibody Conjugation Kit, 3 conjugations for 200 µg antibody
LNK253RHO	LYNX Rapid Plus Rhodamine Antibody Conjugation Kit, 3 conjugations for 20 µg antibody
LNK231D550	LYNX Rapid Plus DyLight 550 Antibody Conjugation Kit, 3 conjugations for 200 µg antibody
LNK233D550	LYNX Rapid Plus DyLight 550 Antibody Conjugation Kit, 3 conjugations for 20 µg antibody
LNK211CY5	LYNX Rapid Plus Cy5 Antibody Conjugation Kit, 3 conjugations for 200 µg antibody
LNK212CY5	LYNX Rapid Plus Cy5 Antibody Conjugation Kit, 1 conjugation for 2 mg antibody
LNK241D650	LYNX Rapid Plus DyLight 650 Antibody Conjugation Kit, 3 conjugations for 200 µg antibody
LNK243D650	LYNX Rapid Plus DyLight 650 Antibody Conjugation Kit, 3 conjugations for 20 µg antibody

Cell Proliferation Assays

An increase or decrease in cell growth and division can be a key result in cytotoxicity and apoptosis assays and can be used to determine the effect of experimental treatments on cellular replication. We offer a broad range of antibodies, kits, and dyes to monitor proliferation. Proliferation can be measured through dye incorporation into live cells, by quantifying key proliferation markers, or by assessing incorporation of the thymidine analog BrdU into DNA.

Cell Proliferation Assay Reagents



The following products are available on bio-rad-antibodies.com.

alamarBlue is a cell proliferation assay that provides a rapid, sensitive, and economical way to quantitatively measure cell proliferation and cytotoxicity in various human and animal cell lines. It can also be used to study mycobacteria, bacteria, and fungi. It is a preferred alternative reagent to similar cell proliferation assays, including MTT, XTT, 3H thymidine, and neutral red.

For More Information

Web: bio-rad.com/cellproliferationassay

- **Simple** — water soluble, just add and measure the formula in cell cultures
- **Flexible** — colorimetric and fluorometric detection for both suspension and adherent cell lines
- **Nontoxic** — alamarBlue does not kill cells and is safe to the user and the environment
- **Reliable** — highly referenced for cytotoxicity and viability assays
- **High sensitivity** — detects as few as 50 cells
- **Stable** — proprietary buffering agents ensure alamarBlue is suitable for time-course studies
- **Economical** — lack of cell lysis allows cells to be cultured for subsequent assays

Ordering Information

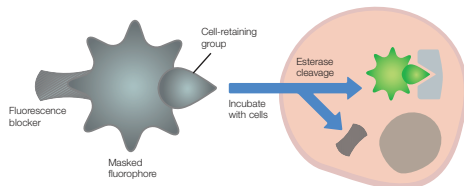
Catalog #	Description
BUF012A	alamarBlue Reagent , 25 ml
BUF012B	alamarBlue Reagent , 100 ml

CytoTrack Cell Proliferation Assay

The following products are available on **bio-rad.com**.

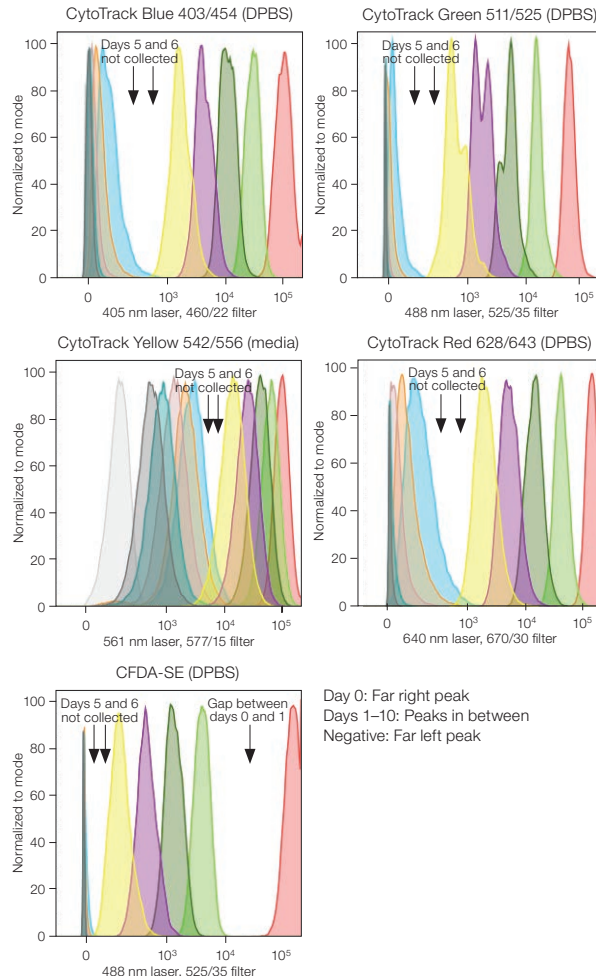
CytoTrack cell proliferation assays efficiently stain live cells for excellent resolution of up to 10 generations in a population of dividing cells. Using a proprietary chemistry, the CytoTrack dye reacts with intracellular proteins and is effectively retained in the cell without efflux. As cell division occurs, the dye is successively halved and the different generations can be determined based on the decrease in fluorescence intensity.

- Dyes are directly added to cell culture media or buffer
- Compatible with intracellular analysis using standard formaldehyde-containing fixatives and saponin-based permeabilization buffers
- Easily combine CytoTrack dyes with fluorescent proteins or antibody-labeled fluorophores for multicolor cell analysis



The nonfluorescent dye is cleared upon cell entry with the cell-retaining group and then covalently binds to intracellular protein, allowing it to remain in the cell during division.

For More Information
 Web: bio-rad.com/cytotrack
 Download bulletin: #10033110
 Request or download bulletin: 6524



CytoTrack and CFDA-SE performance on the ZE5 cell analyzer.
 1x CytoTrack solution in either cell culture media or buffer was added to 1×10^6 Jurkat cells/ml. Cells were incubated in the dark at room temperature for 15 min, then washed and resuspended with cell culture media or buffer. Half were run on the ZE5 cell analyzer (day 0) and the other half left to grow. Each day, half the sample was removed to run on the ZE5 cell analyzer and the cell culture was replenished. DPBS, Dulbecco's phosphate buffered saline.

Ordering Information

Catalog #	Description	Maximum Excitation, nm	Maximum Emission, nm	Optimal Excitation Laser, nm	S3e Cell Sorter	ZE5 Cell Analyzer	ZOE Cell Imager
1351202	CytoTrack Blue 403/454	403	454	405	•	•	
1351203	CytoTrack Green 511/525	511	525	488	•	•	
1351204	CytoTrack Yellow 542/556	542	556	532	•	•	
1351205	CytoTrack Red 628/643	628	643	633 or 640	•	•	

Each kit includes 4 vials of dye and 1 vial DMSO for 200 cell proliferation tests.

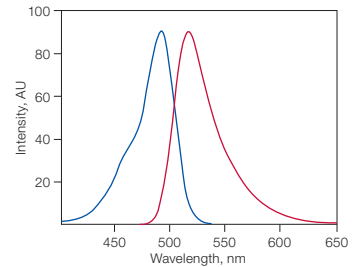
CFDA-SE Cell Proliferation Assay

The following products are available on **bio-rad.com**.

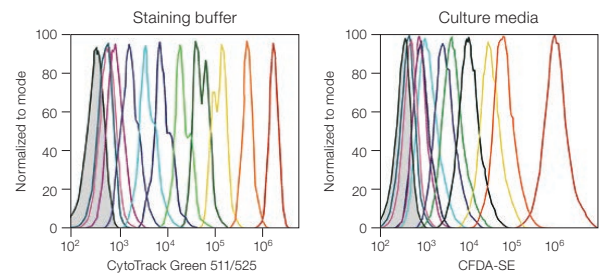
CFDA-SE cell proliferation assay provides carboxyfluorescein diacetate succinimidyl ester (CFDA-SE) in a convenient and easy-to-use format. CFDA-SE is a cell-permeable dye that fluoresces after the acetate groups are cleaved by intracellular esterases, creating carboxyfluorescein succinimidyl ester (CFSE). As the succinimidyl ester group reacts with primary amines of intracellular proteins, CFSE is retained in the cell and is successively halved during cell divisions.

- Visualize up to 8 cell divisions
- Minimize contamination and reduce dilution steps with small vial size

For More Information
 Web: bio-rad.com/cytotrack



CFDA-SE excitation/emission is 492/517 nm in 0.1 M NaOH. Excitation wavelength (—); emission wavelength (—). AU, absorbance unit.



CytoTrack resolves up to ten cell divisions compared to eight for CFDA-SE.

Ordering Information

Catalog #	Description	Maximum Excitation, nm	Maximum Emission, nm	Optimal Excitation Laser, nm	S3e Cell Sorter	ZE5 Cell Analyzer	ZOE Cell Imager
1351201	CFDA-SE Cell Proliferation Assay	492	517	488	•	•	

Includes 5 x 100 µg vials 5(6)-carboxyfluorescein diacetate succinimidyl ester, CFDA-SE.

Cell Proliferation Detection Antibodies

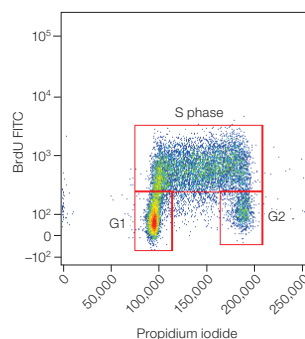


The following products are available on bio-rad-antibodies.com.

The thymidine analog 5'-bromo-2'-deoxyuridine (BrdU) is a popular reagent in various scientific disciplines ranging from cancer to neuroscience research. The chemical is frequently added to samples, for example mammalian cell lines, and subsequently incorporated into newly synthesized DNA during replication.

To measure cell proliferation, the incorporated BrdU is detected with anti-BrdU antibodies, for example the mouse anti-BrdU antibody, clone Bu20a. However, to ensure that the antibody is able to bind to BrdU, DNA treatment prior to antibody staining is required (Liboska et al. 2012). In the literature, endonucleases such as deoxyribonuclease I (DNase I) and acids such as hydrochloric acid are frequently used to cleave or denature the DNA to make incorporated BrdU accessible (Liboska et al. 2012).

Our mouse anti-BrdU antibody, clone Bu20a (catalog #MCA2483), has been tested in flow cytometry and immunocytochemistry. The product has been referenced in 12 publications. It is available in three different sizes (0.2 mg, 0.1 mg, and 20 µg) and is conjugated to FITC. In addition to flow cytometry and immunocytochemistry, the Bu20a clone is recommended for immunohistochemistry.



Staining profile of anti-BrdU antibody. BrdU-labeled human lymphoma cells were stained with mouse anti-BrdU antibody, clone BU20a, at a 1/100 dilution overnight at 4°C. A secondary antibody, FITC-conjugated goat anti-mouse IgG (H/L) (#STAR117F) was used at a 1/50 dilution. Total DNA staining was performed with RaddiDrop propidium iodide (#1351101). FITC, fluorescein isothiocyanate.

Detection of BrdU is commonly performed in combination with total DNA staining. When performing cell cycle analysis, propidium iodide tends to be the DNA stain of choice.

Ki67, proliferating cell nuclear antigen (PCNA), and minichromosome maintenance protein 2 (MCM2) are key proteins for regulating cellular growth and proliferation.

Ordering Information

Catalog #	Description	Clone	Species Reactivity	Applications	Host	Formats
MCA2483	BrdU	Bu20a	–	FC,* IF/ICC, IHC-F, IHC-P*	Mouse	Pur., FITC
AHP2405	BrdU	–	–	F,* IF/ICC, IF,* P	Rabbit	Pur.
HCA117	Ki67	2815	Human	E, IHC-P*	HuCAL	Pur.
HCA053	Ki67	2531	Bovine, dog, human	E, IHC-F, IHC-P,* WB	HuCAL	Pur.
HCA006	Ki67	AbD2531 (Fab)	Bovine, dog, human	E, IF/ICC, IHC-F, IHC-P,* WB	HuCAL	Pur.
VMA00259	MCM2 PrecisionAb Antibody	OT13B6	Human, mouse, rat	WB	Mouse	Pur.
MCA1859	MCM2	CRCT2.1	Human	IHC-P,* WB	Mouse	Pur.
VMA00018	PCNA PrecisionAb	–	Human, mouse, rat	WB	Mouse	Pur.
MCA1558	PCNA	PC10	Broad	FC,* IHC-F, IHC-P, IP, WB	Mouse	Pur., FITC, HRP
AHP1419	PCNA Polyclonal	–	Bovine, dog, human, mouse, rat	E, IHC-P, WB	Rabbit	Pur.

Applications: E, ELISA; FC, flow cytometry; IF/ICC, immunofluorescence/immunocytochemistry; IHC-F, immunohistology-frozen; IHC-P, immunohistology-paraffin; IP, immunoprecipitation; WB, western blotting.

Formats: FITC, fluorescein isothiocyanate; HRP, horseradish peroxidase; Pur., purified.

* Requires special treatment. Refer to product datasheet.

Cell Viability Assays

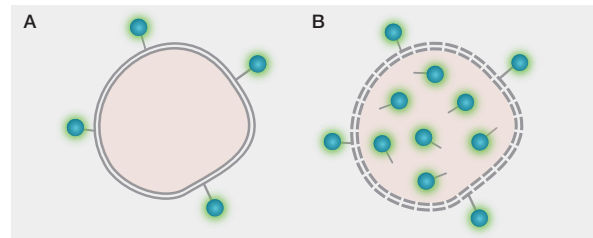
VivaFix Cell Viability Assay

The following products are available on bio-rad.com.

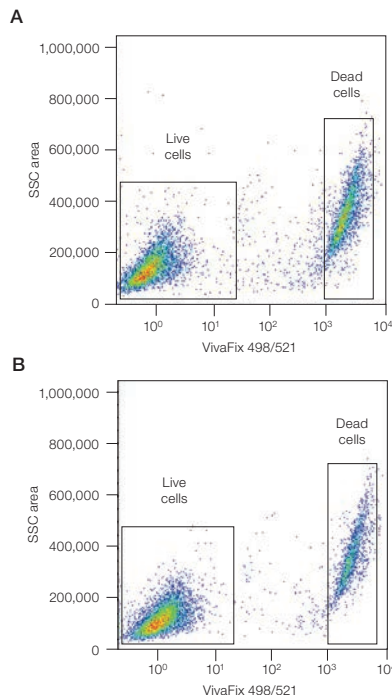
VivaFix cell viability assays provide a sensitive method for determining the viability of live or fixed mammalian cells by flow cytometry, cell sorting, and microscopy.

Using proprietary dyes that covalently bind to primary amines, VivaFix cell viability assays provide at least a 100-fold difference in fluorescence intensity between live and dead cells. The brightness of VivaFix dyes is preserved upon treatment with fixative agents.

- 100-fold discrimination between dead and live cells
- Compatible with fixed and unfixed cells
- 8 different excitation/emission wavelength combinations

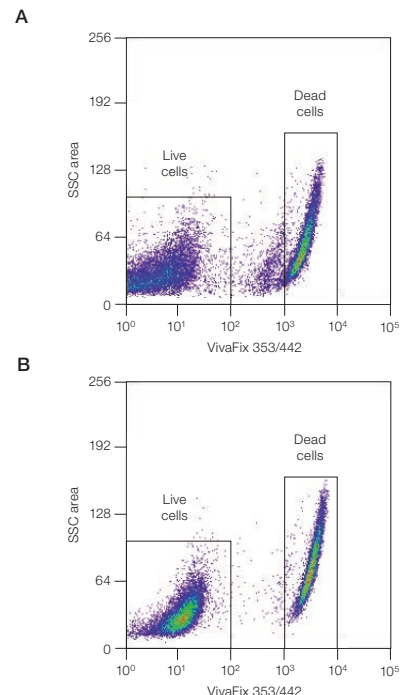


VivaFix cell viability assay chemistry. **A**, VivaFix dyes bind to the cell surface primary amines of viable cells; **B**, in dead cells, where the plasma membrane is compromised, VivaFix dyes are able to permeate the cell and also react with intracellular primary amines. As a result, a greater number of fluorophores is associated with dead cells and at least a 100-fold difference in fluorescence intensity is measured between the live and the dead cells, thereby allowing an easier discrimination between the two populations.



Assessment of cell viability using VivaFix and the S3e cell sorter. Jurkat cells were stained with the VivaFix 498/521 dye, fixed with 3.7% formaldehyde (**A**) or not fixed (**B**), and analyzed with the S3e cell sorter. SSC, side scatter.

For More Information
 Web: bio-rad.com/vivafix



Assessment of cell viability using VivaFix and the ZE5 cell analyzer. Jurkat cells were heat shocked at 65°C for 5 min, then washed and suspended at 2×10^6 cells/ml in phosphate buffered saline. Cells were incubated with VivaFix 353/442 at 37°C for 30 min in the dark. **A**, half of the cells fixed in 1% paraformaldehyde; **B**, half of the cells not fixed. Identical gates for all samples were used during analysis on the ZE5 cell analyzer. SSC, side scatter.

Ordering Information

Catalog #	Description	Maximum Excitation, nm	Maximum Emission, nm	Optimal Excitation Laser, nm	S3e Cell Sorter	ZE5 Cell Analyzer	ZOE Cell Imager
1351111	VivaFix 353/442	353	442	355		•	•
1351112	VivaFix 410/450	410	450	405	•	•	
1351113	VivaFix 408/512	408	512	405	•	•	
1351114	VivaFix 398/550	398	550	405	•	•	
1351115	VivaFix 498/521	498	521	488	•	•	•
1351116	VivaFix 547/573	547	573	561	•	•	•
1351117	VivaFix 583/603	583	603	561	•	•	•
1351118	VivaFix 649/660	649	660	640	•	•	

Each VivaFix assay includes 4 x 50 test vials and 250 µl of DMSO.

ReadiDrop Cell Viability Assays

The following products are available on bio-rad.com.

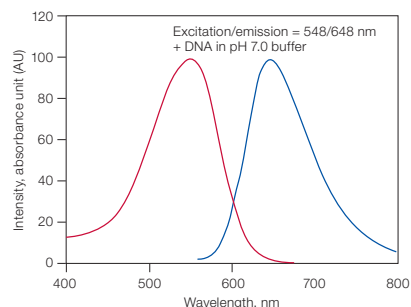
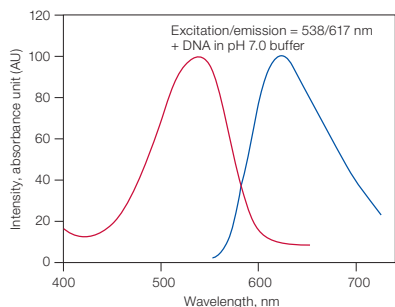
Designed for ease of use in cell sorting and flow cytometry applications, ReadiDrop cell viability assays remove the traditional manual weighing, pipetting, and dilution steps required with commonly available cell viability dyes. Simply add one or two drops to assess the health of your cells.

ReadiDrop Propidium Iodide

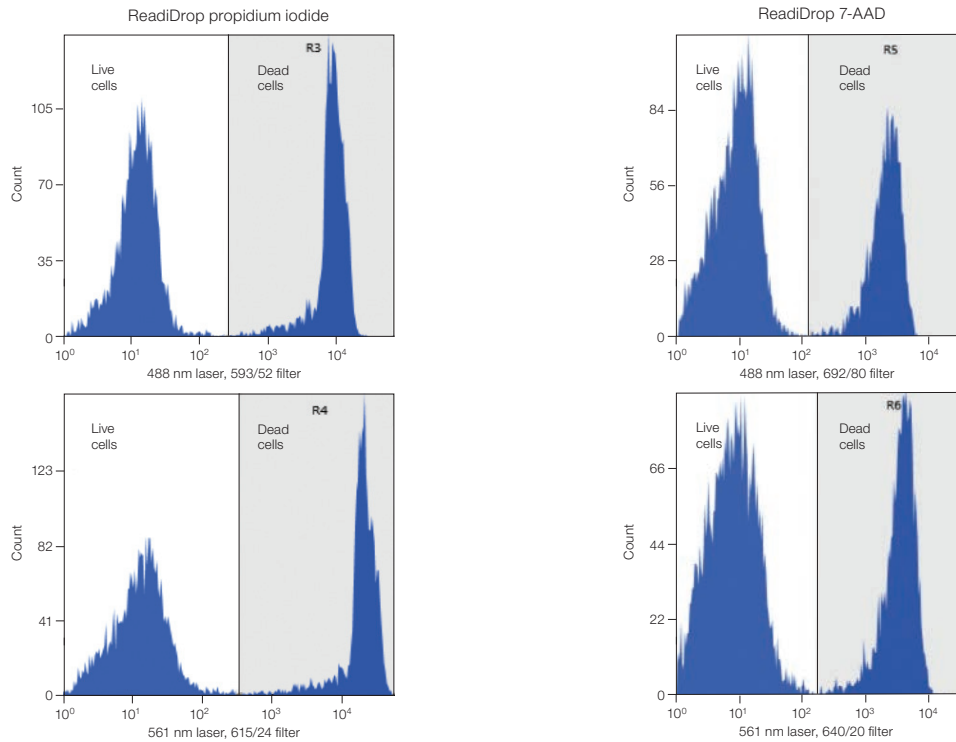
- Cell impermeant nucleic acid-binding dye that binds to double-stranded DNA/RNA
- Ready-to-use formulation in PBS without preservatives
- Stable at room temperature

ReadiDrop 7-AAD

- Cell impermeant DNA binding dye with a high affinity for GC-rich regions of double-stranded DNA
- Ideal for cell sorting and flow cytometry
- Stable at room temperature



Excitation and emission curves for propidium iodide and 7-AAD.



Assessment of cell viability using ReadiDrop reagents and the ZE5 cell analyzer. Jurkat cells were heat shocked at 65°C for 5 min. Cells were washed and resuspended at 2×10^6 cells/ml in phosphate buffered saline (PBS). ReadiDrop propidium iodide or 7-AAD (20 μ l) was added to 0.5 ml cells and incubated for 15 min at room temperature in the dark. Cells were washed once in PBS prior to acquisition on the ZE5 cell analyzer.

For More Information

Web: bio-rad.com/readidrop1

Download bulletin: #10049240

Request or download bulletin: 6522

Ordering Information

Catalog #	Description	Maximum Excitation, nm	Maximum Emission, nm	Optimal Excitation Laser, nm	S3e Cell Sorter	ZE5 Cell Analyzer	ZOE Cell Imager
1351101	Propidium Iodide	538	617	561 or 488	•	•	
1351102	7-AAD	548	648	561 or 488	•	•	

Each assay includes 3 x 3 ml bottles of ready-to-use reagent suspended in PBS for dead cell exclusion in cell sorting and flow cytometry applications.

Flow Cytometry Calibration and Validation Reagents

Standards and Stabilizers



The following products are available on bio-rad-antibodies.com.

Flow Cytometry Absolute Count Standard

Flow Cytometry Absolute Count Standard is a suspension of microspheres that are approximately the size of human lymphocytes (7–9 μm) and are presented at a known concentration. They are internally labeled with multiple fluorochromes and the combination of dyes allows the beads to be excited by a common argon laser (488 nm) and emit in the three standard channels of a flow cytometer (FL1, FL2, and FL3).

RPE Reference Standard

RPE reference standard consists of one vial of microspheres that are uniform in both size and fluorescence and are approximately the size of human lymphocytes (7–9 μm). The excitation and emission spectra of the microspheres match those of cell samples labeled with RPE. It is used to provide qualitative data when compared to a sample but can also be used to calibrate the flow cytometer.

Protein Stabilizer

Protein stabilizer stabilizes antibodies and other proteins or biomolecules in solution. It may be used to stabilize ready-to-use prediluted standards and controls used in immunoassays.

For More Information

Web: bio-rad.com/calibration

Ordering Information

Catalog #	Description
FCSC580	Flow Cytometry Absolute Count Standard , 1 bottle containing 10 ml of microspheres, 20 tests
FCSC899B	RPE Reference Standard , 1 x 5 ml bottle of labeled microbeads for 100 tests
BUF069A	Protein Stabilizer , 100 ml of ready-to-use liquid

Calibration Reagents



The following products are available on bio-rad-antibodies.com.

Quantum kits are used for the quantitation of fluorescence intensity in molecules of equivalent soluble fluorochrome (MESF) units. When used in conjunction with Simply Cellular microspheres, this kit also allows quantitation of antibody binding capacity (ABC). The fluorescence intensity of each of the populations in the kit has been calibrated against solutions of laser-grade fluorescent dye in units of MESF dye per microsphere. The Certified Blank population is used to measure the fluorescence detection threshold of the instrument.

- Quantitation of fluorescence intensity of samples in terms of MESF
- Determination of instrument fluorescence detection threshold
- Determination of instrument linearity
- Data comparison over time and between multiple instruments

Quantum FITC-5 MESF is composed of five calibrated fluorescent populations in one tube, each with different levels of FITC fluorescence intensity, and one blank population of uniform microspheres that are approximately the size of human lymphocytes (7–9 μm). Quantum R-PE MESF is composed of four calibrated fluorescent populations, with different levels of RPE fluorescence intensity.

Quantum Simply Cellular mouse IgG is composed of four coated populations and one blank population of uniform microspheres that are approximately the size of human lymphocytes (7–9 μm). Each of the four sets is coated with goat anti-mouse IgG (Fc-specific) with different calibrated antibody binding capacities (ABC) for mouse monoclonal antibodies. The blank population has no specific binding capacity for mouse IgG. When the bead populations are labeled in the same manner as the cells to be analyzed, they provide a means for constructing a QuickCal calibration curve (ABC values vs. fluorescence intensity), from which samples may be “read.” Cellular antigen expression may thus be quantitated in ABC units.

For More Information

Web: bio-rad.com/calibration

Ordering Information

Catalog #	Description
FCSC555A	Quantum FITC-5 MESF , 1 x 1 ml bottle of unlabeled microbeads, 5 x 1 ml bottles of labeled microbeads for 20 tests
FCSC555B	Quantum FITC-5 MESF , 1 x 5 ml bottle of unlabeled microbeads, 5 x 5 ml bottles of labeled microbeads for 100 tests
FCSC555PA	Quantum FITC-5 MESF (Pre-Mixed) , 1 x 1 ml bottle of unlabeled microbeads, 5 x 1 ml bottles of labeled microbeads for 20 tests
FCSC555PB	Quantum FITC-5 MESF (Pre-Mixed) , 1 x 5 ml bottle of unlabeled microbeads, 5 x 5 ml bottles of labeled microbeads for 100 tests
FCSC827A	Quantum R-PE MESF Medium Level , 1 x 1 ml bottle of unlabeled microbeads, 4 x 1 ml bottles of labeled microbeads for 20 tests
FCSC827B	Quantum R-PE MESF Medium Level , 1 x 5 ml bottle of unlabeled microbeads, 4 x 5 ml bottles of labeled microbeads for 100 tests
FCSC815A	Quantum Simply Cellular Mouse IgG , 1 x 1 ml bottle of unlabeled microbeads, 4 x 1 ml bottles of labeled microbeads for 20 tests
FCSC815B	Quantum Simply Cellular Mouse IgG , 1 x 5 ml bottle of unlabeled microbeads, 4 x 5 ml bottles of labeled microbeads for 100 tests
FCSC815C	Quantum Simply Cellular Mouse IgG , 2 x 7 ml bottle of unlabeled microbeads, 8 x 7 ml bottles of labeled microbeads for 280 tests

Flow Cytometry General Reagents

Accessory Reagents



The following products are available on bio-rad-antibodies.com.

Human Seroblock

Human Fc receptors are expressed on a variety of immune cell types including monocytes, macrophages, B cells, granulocytes, and dendritic cells. Cells that express Fc receptors can produce false positive immunofluorescent staining due to the Fc receptors binding Ig. Human seroblock is designed to prevent such nonspecific staining without interfering with appropriate target staining. Human seroblock is compatible with anti-human antibodies targeting Fc receptors in flow cytometry.

Mouse Seroblock FcR

Mouse seroblock FcR is a rat antibody that recognizes mouse CD16 and CD32 cell surface proteins also known as FcγRIII and FcγRII, respectively. The function of these proteins is to bind IgG molecules via their Fc regions as part of the adaptive immune response. CD16 and/or CD32 are expressed by a wide variety of cells, including monocytes, macrophages, B lymphocytes, granulocytes, NK cells, dendritic cells, and some activated T lymphocytes. The expression of CD16/CD32 antigens can lead to nonspecific binding of test monoclonal antibodies in staining procedures, resulting in high background staining on a wide range of cells. This nonspecific binding may be blocked by pre-incubation of target cells with mouse seroblock FcR, resulting in cleaner staining.

Neutralite Avidin: Cy5 or RPE

Neutralite avidin is a deglycosylated version of egg white avidin that retains its affinity for biotin but has a near-neutral pH that minimizes nonspecific interactions.

Streptavidin: APC or FITC

Streptavidin is designed as a secondary reagent for use in flow cytometry in conjunction with biotinylated primary antibodies. Its conjugates show negligible nonspecific binding to nonbiotinylated macromolecules, and therefore produce very low backgrounds.

Leucoperm Reagent

Leucoperm reagents allow intracellular antigen analysis with the same ease as surface antigens. The only prerequisite is the availability of suitable antibody conjugates. Most commercially available monoclonal antibody conjugates can be used with Leucoperm reagents. Some determinants are sensitive, however, to the fixation step involved. This and the optimal fixation time may have to be determined experimentally for each antibody conjugate.

Staining Buffer

Bio-Rad's staining buffer contains bovine calf serum. It has been optimized for staining both live and fixed cells with antibodies. It is suitable for use with both conjugated and unconjugated antibodies and can be used as an antibody dilution media and a wash buffer. The addition of bovine calf serum reduces background staining of target cells. The staining buffer also contains sodium azide to minimize receptor capping.

Fixation Buffer

The fixation buffer is a paraformaldehyde-based fixative that is suitable for use with most cell types. Paraformaldehyde-containing fixation buffer is essential for intracellular staining prior to permeabilization.

Intracellular Permeabilization/Wash Buffer

This permeabilization and wash buffer is for intracellular staining. Access to intracellular targets, such as cytokines and cytoplasmic proteins, requires permeabilization of the cell membrane after fixation. This buffer has minimal effect on cell morphology. The buffer is supplied as a 10x solution for dilution in water. It can also be used as a wash buffer during intracellular staining to help minimize background staining.

Protein Transport Inhibitors

Protein transport inhibitors can be used to enhance intracellular cytokine staining. As cytokines and chemokines are usually secreted, use of these inhibitors traps the proteins within the cell, leading to a buildup of cytokines in the Golgi apparatus and endoplasmic reticulum. The choice of and culture conditions for these inhibitors may need to be optimized depending on the species and cytokines being stained. Monensin acts by interfering with the Na⁺/H⁺ transport in Golgi apparatus transmembranes. Brefeldin A acts by redistributing proteins from the Golgi apparatus to the endoplasmic reticulum.

Red Cell Lysing Buffer

The red cell lysing buffer, erythrolyse, is available as a 10x solution that is stable for 1 year at room temperature. It is suitable for the lysing of red blood cells in human, rat, and mouse blood.

Activation Reagents

Bio-Rad offers two cell activation reagents, with and without the protein transport inhibitor Brefeldin A. They contain optimized concentrations of phorbol 12-myristate-13-acetate (PMA) and ionomycin, which can be used to activate your cells of interest. Available as a 500x solution in DMSO, they are suitable for activation of cells and stimulating cytokine secretion.

For More Information

Web: bio-rad.com/flowcytometryreagents

Ordering Information

Catalog #	Description
BUF070A	Human Seroblock , includes a solution of buffer and blocking agents for 50 tests
BUF070B	Human Seroblock , includes a solution of buffer and blocking agents for 200 tests
BUF041A	Mouse Seroblock FcR , includes 0.1 mg of purified IgG
BUF041B	Mouse Seroblock FcR , includes 0.5 mg of purified IgG
STAR119	Streptavidin:APC , includes lyophilized product for 100 tests
STAR2B	Streptavidin:FITC , includes 1 mg of streptavidin:FITC at 1 mg/ml
BUF09	Leucoperm Reagent , fixation and permeabilization mediums for 50 tests
BUF09B	Leucoperm Reagent , fixation and permeabilization mediums for 250 tests
BUF09C	Leucoperm Reagent , fixation and permeabilization mediums for 1,000 tests
BUF073	Staining Buffer , 500 ml
BUF071	Fixation Buffer , 100 ml
BUF072	Intracellular Permeabilization/Wash Buffer , 10x solution, 100 ml
BUF074	Monensin , 1000x solution, 1 ml
BUF075	Brefeldin A , 1000x solution, 1 ml
BUF04B	Red Cell Lysing Buffer , 10x solution, 100 tests/20 ml
BUF04C	Red Cell Lysing Buffer , 10x solution, 500 tests/100 ml
BUF036A	Phosphate Buffered Saline (PBS) , 10x, 1 L
BUF077A	Cell Stimulation Reagent (with Brefeldin A) , 500x solution, 0.1 ml
BUF076A	Cell Stimulation Reagent (without Brefeldin A) , 500x solution, 0.1 ml

Nuclear Staining Dyes

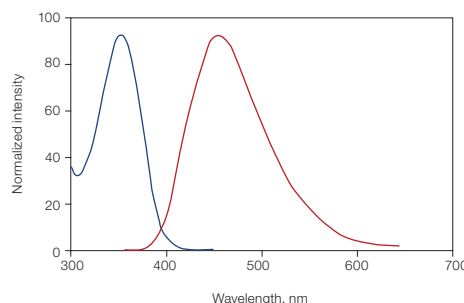
PureBlu Hoechst 33342 Nuclear Staining Dye

The following products are available on bio-rad.com.

PureBlu Hoechst 33342 nuclear staining dye is a highly pure formulation of Hoechst 33342 fluorescent dye. It is available in a user-friendly format that allows easy preparation of the working solution without any weighing step and with a single dilution after resuspension. PureBlu Hoechst 33342 dye permeates cell membranes and binds double-stranded DNA, which enables identification of nuclei within cells. It has a maximum excitation wavelength of 350 nm in the ultraviolet range and can be optimally detected in the blue channel with a maximum emission wavelength of 461 nm.

Product features include:

- Easy to reconstitute without any weighing step
- Optimal for live cell staining
- Compatible with multicolor experiments



Excitation and emission spectra of PureBlu Hoechst 33342 dye.

For More Information

Web: bio-rad.com/PureBluHoechst33342

Download bulletin: #10043283

Request or download bulletin: 6607

See Also

ReadiLink antibody labeling kits: page 48.

VivaFix cell viability assay: page 56.

Cell proliferation assays: page 52.

Ordering Information

Catalog #	Description	Maximum Excitation, nm	Maximum Emission, nm	Optimal Excitation Laser, nm	S3e Cell Sorter	ZE5 Cell Analyzer	ZOE Cell Imager
1351304	PureBlu Hoechst 33342	350	461	355		•	•

Includes 5 x 56 µg vials of Hoechst 33342 powder.

PureBlu DAPI Nuclear Staining Dye

The following products are available on bio-rad.com.

PureBlu DAPI nuclear staining dye is a highly pure formulation of 4',6-diamidino-2-phenylindole dihydrochloride (DAPI) fluorescent dye. It is available in a user-friendly format that allows easy preparation of the working solution without any weighing step and with a single dilution after resuspension. PureBlu DAPI dye permeates cell membranes and binds double-stranded DNA, which enables identification of nuclei within cells. It has a maximum excitation wavelength of 359 nm in the ultraviolet range and can be optimally detected in the blue channel with a maximum emission wavelength of 461 nm.

Product features include:

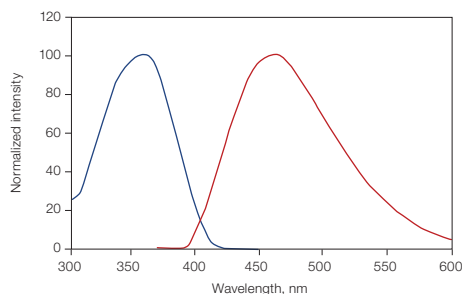
- Easy to reconstitute without any weighing step
- Optimal for fixed cell staining
- Compatible with multicolor experiments

For More Information

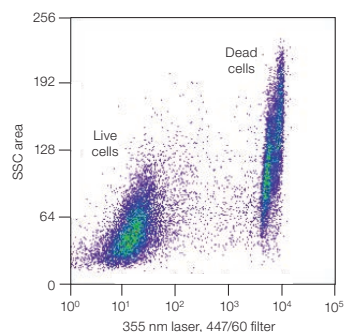
Web: bio-rad.com/PureBluDAPI

Download bulletin: #10043282

Request or download bulletin: 6607

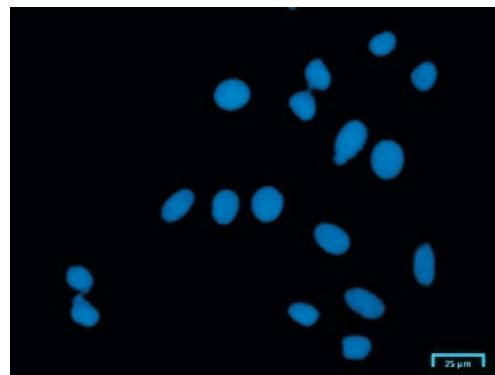


Excitation and emission spectra of PureBlu DAPI dye.

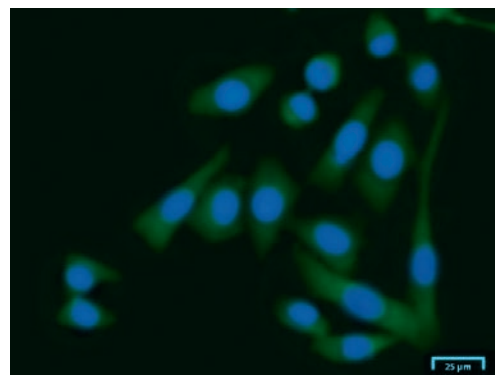


Assessment of cell viability using PureBlu DAPI and the ZE5 cell analyzer. Jurkat cells were heat shocked at 65°C for 5 min. Cells were washed and resuspended at 2×10^6 cells/ml in phosphate buffered saline. 100x PureBlu DAPI (5 μ l) was added to 0.5 ml cells and incubated for 15 min at room temperature in the dark. Cells were then run on the ZE5 cell analyzer. SSC, side scatter.

A



B



PureBlu dyes are the optimal choice for staining the DNA of eukaryotic cells. HeLa cells were transfected with a green fluorescent protein (GFP)-expressing plasmid DNA, stained, and viewed in a six-well dish using a ZOE fluorescent cell imager. **A**, cells counterstained with PureBlu DAPI nuclear staining dye; **B**, merged view of cells stained with PureBlu DAPI and GFP.

Ordering Information

Catalog #	Description	Maximum Excitation, nm	Maximum Emission, nm	Optimal Excitation Laser, nm	S3e Cell Sorter	ZE5 Cell Analyzer	ZOE Cell Imager
1351303	PureBlu DAPI	359	461	355		•	•

Includes 5 x 50 μ g vials of DAPI powder.

Regulated Cell Death Reagents

Cell death is a crucial step in organism development, tissue homeostasis, and host defense. There are many mechanisms of regulated cell death (RCD) such as apoptosis, pyroptosis, necroptosis, and autophagy, where signal transduction molecules are not only initiated but also involved in the propagation of cell death.

Initiation of RCD can result from tissue-turnover, known as programmed cell death (PCD), or disruption of the intercellular or extracellular environment (stress driven RCD). Regulated cell death is involved in immunological processes including elimination of infected cells, removal of effector immune cells, and lymphocyte development.

For More Information

Web: bio-rad.com/rcd

Apoptosis Reagents

Apoptosis, one of the main forms of programmed cell death, is essential for removing damaged or old cells and is involved in organism development, tissue homeostasis, and host defense of infected or transformed cells. Reagents to common apoptosis markers allow determination of cellular apoptosis levels. Activation of the caspase cascade initiates this process through either the intrinsic or extrinsic pathway.

Annexin V Kits



The following products are available on bio-rad-antibodies.com.

Early apoptotic cells can be detected with the help of annexin V, a protein encoded by the *ANXA5* gene, which acts as an anticoagulant. Annexin V, like other members of the annexin protein family, binds to specific membrane proteins. During the early stages of apoptosis, the plasma membrane is rearranged, resulting in changes to the cell membrane's phospholipid asymmetry. One of the effects of these rearrangements is the display of phosphatidylserine (PS) at the outer plasma membrane. In healthy, quiescent cells, PS is exclusively located on the inner membrane and therefore the exposure of

PS is an indication of early apoptosis (Fadeel and Xue, 2009). Annexin V has a high binding affinity for PS in the presence of Ca^{2+} and is therefore a commonly used tool for detecting apoptotic cells.

- Applicable for multicolor flow cytometry experiments; available as conjugates, including biotin, FITC, PE, and APC
- Includes the viability dye propidium iodide for distinction between apoptotic/secondary necrotic and apoptotic cells
- Labeled annexin V, included in the kits, has been conjugated such that the native phospholipid binding properties of annexin V remain unaltered

For More Information

Web: bio-rad.com/apoptosis

Ordering Information

Catalog #	Description
ANNEX20B	Annexin V:Biotin Assay Kit , 1 x 0.1 ml annexin V:Biotin, 1 x 1.6 ml propidium iodide, 1 x 50 ml vial binding buffer for 20 tests
ANNEX100B	Annexin V:Biotin Assay Kit , 1 x 0.5 ml annexin V:Biotin, 1 x 1.6 ml propidium iodide, 1 x 50 ml vial binding buffer for 100 tests
ANNEX300B	Annexin V:Biotin Assay Kit , 1 x 1.5 ml annexin V:Biotin, 2 x 1.6 ml propidium iodide, 1 x 50 ml vial binding buffer for 300 tests
ANNEX20F	Annexin V:FITC Assay Kit , 1 x 0.1 ml annexin V:FITC, 1 x 1.6 ml propidium iodide, 1 x 50 ml vial binding buffer for 20 tests
ANNEX100F	Annexin V:FITC Assay Kit , 1 x 0.5 ml annexin V:FITC, 1 x 1.6 ml propidium iodide, 1 x 50 ml vial binding buffer for 100 tests
ANNEX300F	Annexin V:FITC Assay Kit , 1 x 1.5 ml annexin V:FITC, 2 x 1.6 ml propidium iodide, 1 x 50 ml vial binding buffer for 300 tests
ANNEX50PE	Annexin V:PE Assay Kit , 50 tests annexin V:PE, 7-AAD viability staining solution, 10x binding buffer
ANNEX200PE	Annexin V:PE Assay Kit , 200 tests annexin V:PE, 7-AAD viability staining solution, 10x binding buffer
ANNEX50APC	Annexin V:APC Assay Kit , 50 tests annexin V:APC, propidium iodide staining solution, 10x binding buffer
ANNEX200APC	Annexin V:APC Assay Kit , 200 tests annexin V:APC, propidium iodide staining solution, 10x binding buffer

Caspase Kits



The following products are available on bio-rad-antibodies.com.

Active caspases in apoptotic cells can be analyzed using FLICA kits, which offer:

- Unique cell-permeable and non-cytotoxic FLICA reagent
- Quick and easy method suitable for flow cytometry, fluorescence microscopy, or a plate reader
- Choice of 4 fluorophores, from green to far red

FLICA caspase apoptosis detection kits allow analysis of active caspases in whole, living cells. The unique cell-permeable and non-cytotoxic reagent, called fluorochrome inhibitor of caspases (FLICA), contains a caspase inhibitor sequence (such as VAD) linked to a green (carboxyfluorescein, FAM) or red (sulforhodamine, SR) fluorescent probe. As FLICA binds only to the active caspase, there is no interference from pro-caspases or inactive forms of the enzyme. The remaining fluorescent signal gives a direct measure of the amount of active caspase in the whole living cell. Cellular analysis may be performed with a fluorescence microscope, plate reader, or flow cytometer.

FLICA caspase kits are suitable for cells in suspension and adherent cells, thin tissue sections, and thin frozen sections (but not fixed or paraffin-embedded tissues) from many species, including mammals, insects, and yeast. Various cell types, including HeLa, primary neurons, macrophages, and lymphocytes, have been successfully studied with these kits.

FAM FLICA fluoresces green and the SR FLICA fluoresces red. The latter is useful for studying caspase activity in GFP-transfected cell lines and for dual-color experiments with other green reagents. For general apoptosis detection, poly caspase kits (caspase 1, 3, 4, 5, 6, 7, 8, 9) are recommended, as they will react with all active caspases. Alternatively, individual caspase activity may be studied with the single FLICA caspase kits. The Magic Red reagent contains a caspase inhibitor sequence (DEVD)₂ linked to a red (cresyl violet) fluorescent probe.

The FLICA 660 caspase kits use a target sequence sandwiched between a far red fluorescent 660 dye and a fluoromethylketone to make a quick and flexible method to analyze active caspases.

For More Information
Web: bio-rad.com/apoptosis

Ordering Information

Catalog #	Description
ICT097	FAM FLICA Caspase-1 Kit , 25 tests
ICT098	FAM FLICA Caspase-1 Kit , 100 tests
ICT9122	FLICA 660 Caspase-1 Kit , 25–50 tests
ICT918	FAM FLICA Caspase-2 Kit , 25 tests
ICT093	FAM FLICA Caspase-3/7 Kit , 25 tests
ICT094	FAM FLICA Caspase-3/7 Kit , 100 tests
ICT935	Magic Red Caspase-3/7 Kit , 25 tests
ICT936	Magic Red Caspase-3/7 Kit , 100 tests
ICT9125	FLICA 660 Caspase-3/7 Kit , 25–50 tests
ICT095	FAM FLICA Caspase-6 Kit , 25 tests
ICT096	FAM FLICA Caspase-6 Kit , 100 tests
ICT099	FAM FLICA Caspase-8 Kit , 25 tests
ICT910	FAM FLICA Caspase-8 Kit , 100 tests
ICT912	FAM FLICA Caspase-9 Kit , 25 tests
ICT913	FAM FLICA Caspase-9 Kit , 100 tests
ICT960	SR FLICA Caspase-9 Kit , 25 tests
ICT961	SR FLICA Caspase-9 Kit , 100 tests
ICT923	FAM FLICA Caspase-10 Kit , 100 tests
ICT091	FAM FLICA Poly Caspase Kit , 25 tests
ICT092	FAM FLICA Poly Caspase Kit , 100 tests
ICT916	SR FLICA Poly Caspase Kit , 25 tests
ICT917	SR FLICA Poly Caspase Kit , 100 tests
ICT9120	FLICA 660 Poly Caspase Kit , 25–50 tests

Mitochondrial Membrane Potential Kits



The following products are available on bio-rad-antibodies.com.

An early indication of apoptosis involves a collapse in the electrochemical gradient across the mitochondrial membrane. This is mediated by the opening of permeability transition (PT) pores and is known as the mitochondrial PT event. It is measured by the change in the mitochondrial membrane potential. Loss of mitochondrial membrane potential can be detected by three fluorescent cationic dyes: 5,5',6,6'-tetrachloro-1,1',3,3'-tetraethylbenzimidazolocarbocyanine iodide (JC-1), tetramethylrhodamine ethyl ester (TMRE), and tetramethylrhodamine methyl ester (TMRM).

These dyes are lipophilic and have a delocalized positive charge, which enables them to enter cells and negatively charged healthy mitochondria. In nonapoptotic

mitochondria, the dyes aggregate and will fluoresce bright orange/red. As apoptosis occurs and the mitochondrial membrane potential collapses, the dyes disperse throughout the cell and the fluorescence either diminishes (MitoPT TMRE and TMRM kits) or changes color (MitoPT JC-1 kit). This allows an easy distinction between apoptotic and nonapoptotic fluorescent cells, which can be read with a flow cytometer, fluorescence microscope, or a fluorescence plate reader using black microtiter plates.

- Quick and easy staining method clearly differentiates nonapoptotic and apoptotic cells
- MitoPT TMRE and TMRM kits are ideal for single-cell multiparametric analyses
- Suitable for flow cytometry, fluorescence microscopy, or a plate reader

For More Information
Web: bio-rad.com/apoptosis

Ordering Information

Catalog #	Description
ICT946	Mitochondrial Membrane Potential: MitoPT TMRE Kit , 500 tests
ICT948	Mitochondrial Membrane Potential: MitoPT TMRM Kit , 500 tests
ICT943	Mitochondrial Permeability Transition: MitoPT JC-1 Kit , 100 tests
ICT944	Mitochondrial Permeability Transition: MitoPT JC-1 Kit , 400 tests

Real-Time Apoptosis Fluorescent Microscopy Kit



The following products are available on bio-rad-antibodies.com.

Compatible with conventional fluorescence microscopes and the ZOE fluorescent cell imager, IANBD (excitation maximum 488 nm, emission maximum 530 nm) can be easily detected by FITC filter sets.

- Ideal for performing time-lapse live cell imaging experiments
- Visualize apoptosis events in real time
- Perfect for comparing mutant and wild type strains
- Observe transient and reversible apoptotic events
- No washing steps or special buffers required — just add the pSIVA probe and start imaging
- Differentiate apoptotic from necrotic/dead cells
- The kit includes the propidium iodide viability dye

For More Information
Web: bio-rad.com/apoptosis

Ordering Information

Catalog #	Description
APO004	pSIVA Real-Time Apoptosis Fluorescent Microscopy Kit , 1 kit

Serine Protease Detection Kits



The following products are available on bio-rad-antibodies.com.

FAM FLISP reagents are noncytotoxic, cell permeant green fluorescent inhibitors that covalently bind to active serine protease enzymes. Simply add FLISP directly to cells in culture, incubate, and wash to detect active chymotrypsin-like enzyme inside the cell. FLISP will covalently bind an active chymotrypsin-like enzyme and be retained within the cell, whereas unbound reagent will be able to diffuse out. Cells containing lower levels of active enzyme will bind less FLISP and therefore be less fluorescent after the wash steps.

Serine proteases, such as trypsin and chymotrypsin, are defined by the presence of a serine residue at the active center of the enzyme, which participates in the formation of an intermediate ester to transiently form an acyl-enzyme complex. Activation of serine proteases plays major roles

in several different cellular functions, including apoptosis, tumor malignancy, and as diagnostic and prognostic indicators of breast, head, and neck carcinomas. Serine protease activation is also thought to play a role in infections and transplant rejection. There is increased serine protease activity in apoptotic cells downstream of caspase activation, and this may complement caspase-mediated cell death.

Counterstaining with a viability dye such as propidium iodide (contained in the kit) allows identification of necrotic cells by flow cytometry. Nuclear morphology may be observed by fluorescence microscopy using Hoechst (contained in the kit).

The kits are available with either a chloromethyl ketone (CMK) or diphenyl 1-(N-peptidylamino) alkanephosphonate (DAP) reactive group-containing compound with different inhibitor sequences (Phe or Leu) to allow identification of chymotrypsin or chymotrypsin C.

For More Information
[Web: bio-rad.com/apoptosis](http://bio-rad.com/apoptosis)

Ordering Information

Catalog #	Description
APO006	FLISP FAM-Phe-CMK Serine Protease Assay Kit, 25 tests
APO007	FLISP FAM-Leu-CMK Serine Protease Assay Kit, 25 tests
APO008	FLISP FAM-Leu-DAP Serine Protease Assay Kit, 25 tests
APO009	FLISP FAM-Phe-DAP Serine Protease Assay Kit, 25 tests

Apoptosis Antibodies

Visit bio-rad.com/apoptosis for a full list of our apoptosis products.

Ordering Information

Catalog #	Description	Clone	Species Reactivity	Applications	Host	Formats
MCA2712	Annexin V	VAA-33	Human	E, FC	Mouse	Pur., Biot., FITC
AHP963	Caspase-1	Polyclonal	Human	IHC-P,* WB	Rabbit	Pur.
AHP1423	Caspase-2	Polyclonal	Human, mouse	IHC-P,* WB	Rabbit	Pur.
AHP2717	Caspase-3	Polyclonal	Human, mouse, rat	IHC-P, WB	Rabbit	Pur.
AHP964	Caspase-4	Polyclonal	Human, mouse	IHC-P,* WB	Rabbit	Pur.
AHP965	Caspase-5	Polyclonal	Human	WB	Rabbit	Pur.
AHP1788	Caspase-7	Polyclonal	Human, mouse, rat	IHC-P,* WB	Rabbit	Pur.
AHP966	Caspase-7	Polyclonal	Human, mouse, rat	IHC-P,* WB	Rabbit	Pur.
MCA2739	Caspase-8	4-1-20	Human	E, WB	Mouse	Pur.
AHP967	Caspase-8	Polyclonal	Human, mouse, rat	WB	Rabbit	Pur.
AHP492	Caspase-9	Polyclonal	Human, mouse, rat	WB	Rabbit	Pur.
VPA00788	Caspase-10 PrecisionAb	Polyclonal	Human, mouse	WB	Rabbit	Pur.
AHP626	Caspase-12	Polyclonal	Human, mouse, rat	IHC-P,* WB	Rabbit	Pur.
AHP1175	Caspase-14	Polyclonal	Human, mouse, rat	WB	Rabbit	Pur.
AHP2286	Caspase-3 Active	Polyclonal	Human, mouse, rat	IHC-P, WB	Rabbit	Pur.
AHP2288	Caspase-9 Active	Polyclonal	Human	IP, WB	Rabbit	Pur.
MCA2740	Cytochrome c	2G8	Human	E, FC*	Mouse	Pur.
VMA00017	Bcl-2 PrecisionAb	-	Human	WB	Mouse	Pur.
VPA00775	Bcl-2 PrecisionAb	Polyclonal	Human	WB	Rabbit	Pur.
MCA1550	Bcl-2	100	Human	FC,* IHC-F, IHC-P,* IP, WB	Mouse	Pur.
MCA1539	CD95	LOB 3/17	Human	FC, IP	Mouse	Pur., FITC, RPE
AHP2306	CD95	Polyclonal	Human, mouse, rat	IHC-P, WB	Rabbit	Pur.
MCA2409	CD178	14C2	Human	E, FC, IP	Mouse	Pur., A488, A647, RPE
MCA2896	CD178	MFL4	Mouse, rat	FC, FN	Hamster	Pur., A488, A647, FITC, EL, RPE
MCA2408GA	CD178	10F2	Human	E, FC, FN, IP	Mouse	Pur., EL
MCA2118	Granzyme B	GB7	Human	IHC-P,* WB	Mouse	Pur.
MCA2119B	Granzyme B	GB10	Human	E	Mouse	Biot.
MCA2120	Granzyme B	GB11	Human	E, FC,* IHC-F, IF/ICC, IP	Mouse	Pur.

Applications: E, ELISA; FC, flow cytometry; FN, functional assays; IF/ICC, immunofluorescence/immunocytochemistry; IHC-F, immunohistology-frozen; IHC-P, immunohistology-paraffin; IP, immunoprecipitation; WB, western blotting.

Formats: Axxx, Alexa Fluor; Biot., biotin; EL, low endotoxin; FITC, fluorescein isothiocyanate; Pur., purified; RPE, R-phycoerythrin.

* Requires special treatment. Refer to product datasheet.

Autophagy Reagents

Autophagy is the orderly degradation and recycling of cytoplasmic components via the lysosome. It is thought to be a repair and survival response during stress and infection and has been linked closely to apoptosis. Autophagy can be studied using antibodies or analysis of active cathepsins. During autophagy, cathepsins hydrolyze and degrade cytoplasmic proteins, bulk cytoplasm, and dysfunctional organelles for recycling. Increased levels of cathepsin activity have been linked with conditions such as cancer, arthritis, and Alzheimer's disease, indicating that cathepsin proteins may be a potential target for novel therapies.

Cathepsin Detection Kits



The following products are available on bio-rad-antibodies.com.

Cathepsin detection kits, available in green or red fluorescence, allow analysis of active cathepsins in whole, live cells. They use a substrate-based assay with a rhodamine 110 or a cresyl violet fluorophore probe. Both probes are nonfluorescent when bound through amide links to two target peptides. Active cathepsins can cleave the target peptide at an amide link, causing the rhodamine or mono cresyl violet fluorophores to emit fluorescence.

Rhodamine 110 emits at 525 nm when excited at 500 nm and can be detected using microscopy or flow cytometry using the 488 nm laser and a 525/35 nm filter. Cresyl violet emits at 610 nm when excited at 540–590 nm.

Uncleaved target peptides have excitation and emission wavelengths of 592 nm and 628 nm respectively, resulting in minimal cellular autofluorescence.

The photostable substrates for cathepsin B: (z-arginine-arginine)₂, cathepsin K: (z-leucine-arginine)₂ and cathepsin

L: (z-phenylalanine-arginine)₂ easily cross the plasma membrane and intracellular organelle membranes of live cells. Cathepsin activity can be determined by the accumulation of fluorescence when hydrolysis occurs within organelles. An increase in cathepsin activity results in a greater fluorescent signal. Cellular analysis may be performed with a flow cytometer, fluorescence microscope, or plate reader depending on the kit.

All the kits contain a Hoechst stain for labeling nuclei, and the Magic Red kits contain acridine orange for lysosome and organelle identification.

The cathepsin kits are suitable for cells in suspension, adherent cells, and thin frozen tissue sections (but not fixed or paraffin-embedded cells) from many species including mammalian, insect, and yeast. Various cell types, including Jurkat, HL-60, THP-1, fibroblasts, UMUC-3, MCF-7, and U937 cells, have also been successfully studied with these kits.

For More Information
Web: bio-rad.com/autophagy

Ordering Information

Catalog #	Description
ICT937	Magic Red Cathepsin B Kit , 25 tests
ICT938	Magic Red Cathepsin B Kit , 100 tests
ICT939	Magic Red Cathepsin K Kit , 25 tests
ICT941	Magic Red Cathepsin L Kit , 25 tests
ICT942	Magic Red Cathepsin L Kit , 100 tests
ICT9151	Green Cathepsin B Kit , 25 tests
ICT9152	Green Cathepsin B Kit , 100 tests

Flow Cytometry Autophagy Assay



The following products are available on bio-rad-antibodies.com.

Autophagy probe red is a cell permeant, aliphatic molecule that fluoresces brightly when inserted into the lipid membranes of autophagosomes and autolysosomes. Autophagy is a dynamic process typically divided into three stages.

Autophagy probe red can be quickly and easily detected by flow cytometry in cells undergoing autophagy, with optimal excitation at 590 nm and peak emission at 620 nm (ZE5 cell analyzer settings: 561 nm laser and 615/24 or 640/20 filter).

For More Information
Web: bio-rad.com/autophagy

Ordering Information

Catalog #	Description
APO010A	Autophagy Assay Red Detection Kit , 50 tests
APO010B	Autophagy Assay Red Detection Kit , 200 tests

Autophagy Antibodies

Visit bio-rad.com/autophagy for a full list of our autophagy products.

Ordering Information

Catalog #	Description	Clone	Species Reactivity	Applications	Host	Formats
AHP1009	Beclin-1	Polyclonal	Human, mouse, rat	FC, IHC-P,* WB	Rabbit	Pur.
AHP2167	MAP1LC3A/B (N-Terminal)	Polyclonal	Human	IF/ICC, WB	Rabbit	Pur.
AHP2448	CD107a (LAMP-1)	Polyclonal	Mouse, rat	IF/ICC, IHC-P, WB	Rabbit	Pur.
MCA2881Z	CD107a (LAMP-1)	B-T47	Mouse	FC, IHC-P	Mouse	Pres. Fr.
MCA4707T	CD107a (LAMP-1)	1D4B	Mouse	FC, IHC-F, IF/ICC, IP	Rat	Pur.
MCA2315GA	CD107a (LAMP-1)	4E9/11	Pig	FC,* IHC-F, IF/ICC, IHC-P,* IP, WB	Mouse	Pur., A647, FITC
AHP2324	CD107b (LAMP-2)	Polyclonal	Human, mouse, rat	WB	Rabbit	Pur.
AHP2325	CD107b (LAMP-2)	Polyclonal	Human, mouse, rat	E, IF/ICC, WB	Rabbit	Pur.
AHP1634	CD107b (LAMP-2)	Polyclonal	Human, mouse, rat	IHC-F, WB	Rabbit	Pur.
MCA2293	CD107b (LAMP-2)	M3/84	Mouse	FC,* IHC-F, IHC-P, IP, WB	Mouse	Pur.
MCA2558GA	CD107b (LAMP-2)	AC17	Dog, human	FC,* IF/ICC, IP, WB	Mouse	Pur., A647, FITC, RPE

Applications: E, ELISA; FC, flow cytometry; IF/ICC, immunofluorescence/immunocytochemistry; IHC-F, immunohistology-frozen; IHC-P, immunohistology-paraffin; IP, immunoprecipitation; WB, western blotting.
Formats: Axxx, Alexa Fluor; FITC, fluorescein isothiocyanate; Pres. Fr., preservative free; Pur., purified; RPE, R-phycoerythrin.
* Requires special treatment. Refer to product datasheet.

Pyroptosis Reagents

Pyroptosis is a form of lytic-regulated cell death triggered by perturbations of extracellular and intracellular homeostasis in the innate immune system. Its proinflammatory nature distinguishes it from other forms of RCD, such as apoptosis and necroptosis, and it is in fact the most immunogenic of all the cell death mechanisms. It has distinct morphological features such as cellular swelling, chromatin condensation, and plasma membrane permeabilization. Caspase-1, activated by various inflammasomes, cleaves gasdermin D into a 199 amino acid carboxy-terminal fragment and a 242 amino acid amino-terminal fragment. The amino-terminal of cleaved gasdermin D integrates into the cell membrane to form a pore that directly leads to cell death.

Pyroptosis Detection Kits



The following products are available on bio-rad-antibodies.com.

Pyroptosis/Caspase-1 assay kits utilize our popular FLICA technology to detect caspase-1 activation. FLICA probes are cell permeant noncytotoxic fluorescent labeled inhibitors of caspases that covalently bind with active caspase enzymes. These kits contain the caspase-1 inhibitor reagent YVAD-FMK, which has the preferred binding sequence for caspase-1, Tyr-Val-Ala-Asp (YVAD). This preferred caspase-1 binding sequence is labeled with either FAM, a green fluorescent dye, or 660, a far red fluorescent dye, and linked to a fluoromethyl ketone (FMK) reactive entity. Caspase-1 will not cleave the FLICA inhibitor probe; instead, it forms an irreversible covalent bond with the FMK group on the reagent and becomes inhibited from further enzymatic activity. FLICA can be

added directly to the cell culture medium, incubated, and washed. It is cell permeant and will efficiently diffuse in and out of all cells. If there is an active caspase-1 enzyme inside the cell, it will covalently bind with YVAD-FMK and retain the fluorescent signal within the cell. Unbound FLICA will diffuse out of the cell during the subsequent wash steps. Therefore, positive cells will retain a higher concentration of FLICA and fluoresce brighter than negative cells. There is no interference from procaspases or inactive forms of the enzymes. After labeling with FLICA, cells can be counterstained with other reagents and fixed or frozen. Cells labeled with YVAD-FMK can be counterstained with reagents such as the red live/dead stains propidium iodide and 7-AAD. Nuclear morphology may be concurrently observed using Hoechst 33342 (included in the kit), a blue DNA-binding dye. Cells can be viewed through a fluorescence microscope or flow cytometer.

For More Information
Web: bio-rad.com/pyroptosis

Ordering Information

Catalog #	Description
ICT9145	Pyroptosis FAM Caspase-1 Kit , 25–50 tests
ICT9146	Pyroptosis FAM Caspase-1 Kit , 100–200 tests
ICT9158	Pyroptosis 660 Caspase-1 Kit , 25 tests

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Cell Imaging



Cell Imaging

Bio-Rad's suite of tools for fluorescence microscopy and cell imaging includes the ZOE fluorescent cell imager and nuclear dyes.

See Also

PureBlu Hoechst 33342 nuclear staining dye: page 63.
 PureBlu DAPI nuclear staining dye: page 63.
 ReadILink antibody labeling kits: page 48.
 VivaFix cell viability assays: page 56.
 Cell proliferation assays: page 52.

ZOE Fluorescent Cell Imager

The ZOE fluorescent cell imager is a complete imaging system that is suitable for routine cell culture and imaging applications. It eliminates the complexities of cell imaging by combining the ease of use of a personal tablet with the power of an inverted microscope. An intuitive Android-based touch-screen interface is used to control brightfield, three fluorescence channels, and the integrated digital camera.

As a fully integrated system with long-life light-emitting diodes (LEDs), the ZOE cell imager is a robust imaging device ready for intensive daily use. There are no time-consuming setup and hardware adjustments to perform (optical and illumination alignment, changing filter sets or objective lenses) or parts with a limited life span that could result in costly maintenance (replacing mercury arc lamps).

The ZOE cell imager uses high-quality hard-coated filter sets that provide high light transmission and long life. Its 20x plan achromatic objective lens is mounted in a proprietary manner, resulting in a wide field of view (0.70 mm²) that is ~180% greater than that of a traditionally mounted 20x objective lens. When zoomed out it is approximately equivalent to that of a 4x objective. When needed, use the pinch-to-zoom gesture to magnify up to 20x by digital zoom while retaining resolution (1 μm).

Product features include:

- **Simplified cell imaging** — the intuitive touch-screen interface allows users to view cells, capture images, and create multichannel merges
- **Flexible system** — brightfield and three fluorescence channels enable use for routine cell culture applications as well as more sophisticated imaging applications
- **Fluorescence at your bench** — an integrated light shield permits fluorescence imaging in ambient light



ZOE Fluorescent Cell Imager

- **Robust construction** — fully integrated system with long-life LEDs is ready for intensive daily use
- **LED light sources** — thousands of hours of illumination that are instantly ready after power on
- **Large field of view** — the motorized stage and large field of view allow you to see more of your sample, faster
- **Small footprint** — compact size accommodates crowded laboratory benches

For More Information

Web: bio-rad.com/ZOE

Request or download bulletin: 6585

Ordering Information

Catalog #	Description
1450031	ZOE Fluorescent Cell Imager , 120–240 V, includes instrument, power supply, USB flash drive

Kits and Reagents for Cell Imaging

Bio-Rad offers a variety of kits and reagents for use with the ZOE fluorescent cell imager.

Ordering Information

Catalog #	Description
Nuclear Staining Dyes	
1351303	PureBlu DAPI Nuclear Staining Dye , pkg of 1, includes 5 x 50 µg vials of DAPI powder
1351304	PureBlu Hoechst 33342 Nuclear Staining Dye , pkg of 1, includes 5 x 56 µg vials of Hoechst 33342 powder
Antibody Labeling Kits	
1351002	ReadiLink 492/516 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351003	ReadiLink 555/570 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
1351004	ReadiLink 594/610 Antibody Labeling Kit , includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies
Fixable Viability Dyes	
1351111	VivaFix 353/442 Cell Viability Assay , pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
1351115	VivaFix 498/521 Cell Viability Assay , pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
1351116	VivaFix 547/573 Cell Viability Assay , pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays
1351117	VivaFix 583/603 Cell Viability Assay , pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays

Nuclear Staining Dyes

1351303 **PureBlu DAPI Nuclear Staining Dye**, pkg of 1, includes 5 x 50 µg vials of DAPI powder

1351304 **PureBlu Hoechst 33342 Nuclear Staining Dye**, pkg of 1, includes 5 x 56 µg vials of Hoechst 33342 powder

Antibody Labeling Kits

1351002 **ReadiLink 492/516 Antibody Labeling Kit**, includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies

1351003 **ReadiLink 555/570 Antibody Labeling Kit**, includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies

1351004 **ReadiLink 594/610 Antibody Labeling Kit**, includes 2 vials of labeling dye, reaction buffer, and dyed quench buffer for labeling 2 x 50 µg of antibodies

Fixable Viability Dyes

1351111 **VivaFix 353/442 Cell Viability Assay**, pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays

1351115 **VivaFix 498/521 Cell Viability Assay**, pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays

1351116 **VivaFix 547/573 Cell Viability Assay**, pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays

1351117 **VivaFix 583/603 Cell Viability Assay**, pkg of 1, kit includes 4 x 50 assay vials and 250 µl of DMSO, for running 200 assays

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Chromatography Overview

A Range of Options

Bio-Rad offers a wide selection of chromatography tools for the life scientist involved in analytical, preparative, or process chromatography. We have become known as a quality provider of chromatography resins for reagent cleanup and biomolecule purification, manufacturing flexible and intuitive instrumentation and software and prepacked and empty columns for sample separations.

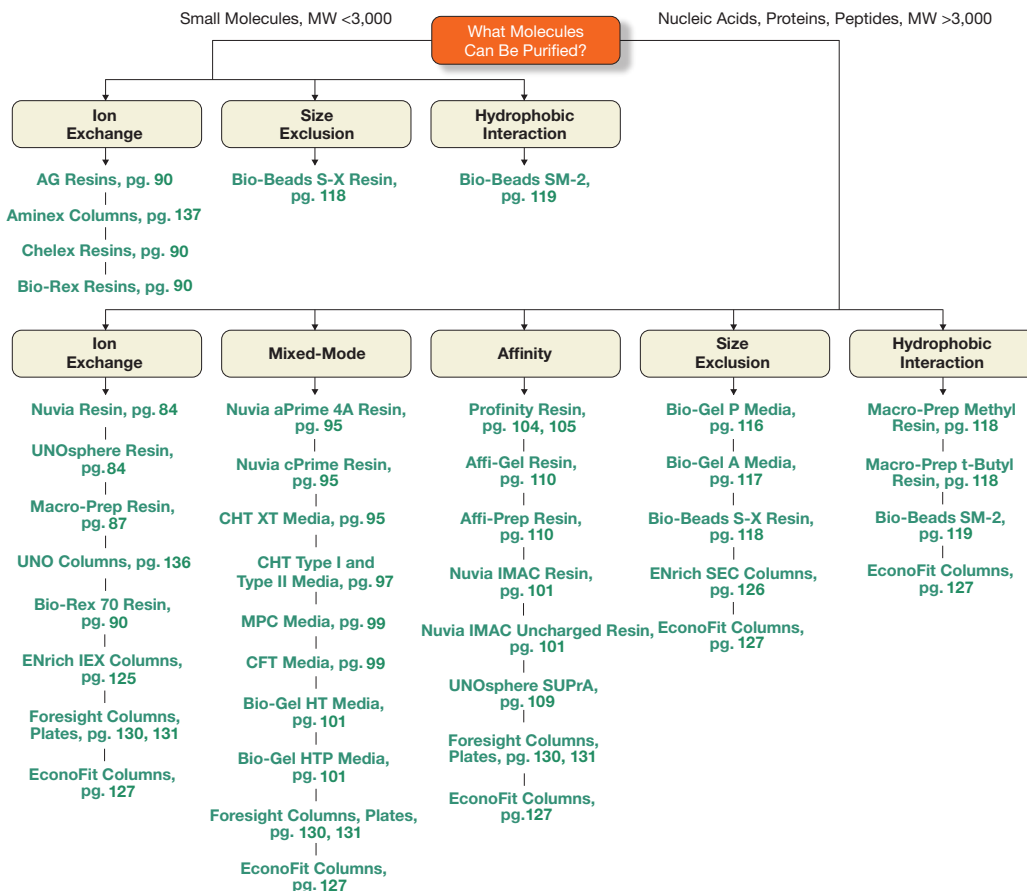
Throughput, capacity, selectivity, resolution, and process economics are among the considerations when selecting any chromatography resin, column, or instrument. We offer products for each phase of purification and manufacture resins for any scale from nanograms to kilograms.

Bio-Rad offers a wide range of lab and process chromatography resins for ion exchange, hydroxyapatite, affinity, size exclusion, and hydrophobic interaction chromatography as well as chromatography standards. For convenient sample preparation products, see page 1. Bio-Rad's process chromatography resins are used worldwide to manufacture registered biotherapeutics and diagnostics. All chromatography resins are manufactured in an ISO 9001 registered manufacturing facility. The manufacturing processes are audited and registered by National Quality Assurance Limited against the provisions of ANSI/ISO/ASQ 9001:2000.

Development, Application, and Validation Support

Bio-Rad provides development and application support for large-scale separations. We also offer regulatory assistance and regulatory support files to help validate the chromatography resins used in your processes. These files contain information essential to validation, including general product information, specification test procedures, identification tests, and biological safety data.

 [Learn More about the Technology](http://bio-rad.com/tech/chrom)
 Web: bio-rad.com/tech/chrom



Chromatography Media

Bio-Rad offers process-scale developers a selection of media for protein separation using ion exchange, hydroxyapatite and fluoroapatite, affinity, size exclusion (gel filtration), and hydrophobic interaction chromatography. These media offer high binding capacity, base stability, and high flow rates and are available in multi-liter quantities.

For More Information

Request or download bulletin: 6713

Chromatography Media Selection Guide

Media	Packing Format*	Suitability**			Application	Page
		Analytical Scale	Pilot/Preparative Scale	Process Scale		
Anion Exchange						
AG 1	B, GC	++++	++++	++++	Strong exchanger. Separation of low MW peptides, nucleotides, inorganic ions using different cross-linkages; high selectivity for anions such as chloride; gravity or low-pressure use	90
AG MP-1M	B, GC	++++	++	+	Strong exchanger. Macroporous, equivalent to AG 1 for MW >1,000,000; gravity or low-pressure use	90
Bio-Rex 5 and AG 4-X4	B, GC	++++	++		Weak exchanger. Used to remove organic acids from sugars; adsorption of mineral acids; gravity or low-pressure use	90
UNO Q	MC	++++			Strong exchanger. High-resolution biomolecule separation at high flow rates; pH stability 2–12	136
Macro-Prep High Q	B, C, E	+++	++++	+++	Strong exchanger. High-capacity biomolecule separation; unique surface chemistry allows contaminant removal; pH stability 1–10	87
Macro-Prep 25 Q	B	++++	++++	+	Strong exchanger. Similar to Macro-Prep High Q but 25 µm particle size allows higher-resolution separation; unique surface chemistry allows contaminant removal; pH stability 1–10	87
Macro-Prep DEAE	B, C, E	+++	++++	+++	Weak exchanger. High-capacity biomolecule separation; unique surface chemistry allows contaminant removal; pH stability 1–10	87
UNOsphere Q	B, C, E, F	++++	++++	++++	Strong exchanger. High-productivity, high-capacity biomolecule separation; pH stability 1–14	84
Aminex	HPLC	++++			High-pressure separation of carbohydrates, sugars, and small organic molecules; delivers industry-standard performance (U.S. Pharmacopeia)	137
Nuvia Q	B, E, F	++++	++++	++++	Strong exchanger. Similar to UNOsphere Q but surface modification allows extremely high capacity biomolecule separation; pH stability 1–14	84
Nuvia HP-Q	B, E, F	++++	++++	++++	Strong anion exchange resin specifically designed for the high-throughput purification of large biomolecules	84
Cation Exchange						
AG 50W	B, GC	++++	++++	++++	Strong exchanger. Lower cross-linkages useful for peptide and nucleotide separation; higher cross-linkages useful for small peptide and metals separation and removal of cations; gravity or low-pressure use	90
AG MP-50	B, GC	++++	++	+	Strong exchanger. Macroporous equivalent to AG 50W for MW >1,000,000; gravity or low-pressure use	90
Bio-Rex 70	B	++++	++	++	Weak exchanger. High capacity for high MW (>1,000,000) solutes; can be used for purification and fractionation of peptides, proteins, enzymes, and other cationic molecules. Amenable to large-scale purification	90

* B, bottle; C, cartridge (1 or 5 ml); E, EconoFit columns; F, Foresight prepacked plates and columns; GC, gravity column; HPLC, high-pressure column; MC, medium-pressure column; SC, spin column. ** +, low suitability; ++, moderate suitability; +++, suitable; +++++, high suitability.

continues

Chromatography Media Selection Guide

Media	Packing Format*	Suitability**			Application	Page
		Analytical Scale	Pilot/ Preparative Scale	Process Scale		
Chelex 100	B, GC	++++	++++	++++	Weak exchanger. Chelating resin removes metals and is suitable for PCR applications; can also be used for ultrapurification of buffers and ionic reagents; gravity or low-pressure use. Available in molecular biology and biotechnology grades	90
UNO S	MC	++++			Strong exchanger. High-resolution biomolecule separation at high flow rates; pH stability 2–12	136
Macro-Prep 25 S	B	++++	++++	+	Strong exchanger. Similar to Macro-Prep High S, but 25 µm particle size allows higher-resolution separation; unique surface chemistry allows contaminant removal; pH stability 1–10	87
Macro-Prep High S	B, C, E	+++	++++	+++	Strong exchanger. High-capacity biomolecule separation; unique surface chemistry allows contaminant removal; pH stability 1–10	87
Macro-Prep CM	B, E	+++	++++	+++	Weak exchanger. High-capacity biomolecule separation; unique surface chemistry allows contaminant removal; pH stability 1–10	87
UNOsphere S	B, C, E, F	++++	++++	++++	Strong exchanger. High-capacity biomolecule separation; pH stability 1–14	84
Nuvia S	B, C, E, F	++++	++++	++++	Strong exchanger. Similar to UNOsphere S but surface modification allows extremely high capacity biomolecule separation; pH stability 1–14	84
Nuvia HR-S	B, C, E, F	++++	++++	++++	Strong exchanger. Has smaller particle size for high resolution	84
Specialty Ion Exchange						
AG 11 A8	B	++++	++	++	Ion retardation — contains cation and anion exchange sites that weakly interact with mobile ions; can be used for desalting of nonionic molecules with water elution, such as removal of SDS from protein and adsorption of mineral acids	90
AG 501-X8	B	++++	+++	+++	Mixed bed, consists of equivalent amounts of AG 1-X8 and AG 50W-X8. May be used to deionize impure water, urea, formamide, and acrylamide to provide extremely pure reagents	90
Bio-Rex MSZ 501	B	++++	++	++	Mixed bed, consists of equivalent amounts of Bio-Rex MSZ 1 and Bio-Rex MSZ 50 resin. Monosized ion exchange; desalting of water and nonelectrolytes. Ideal for large-scale industrial applications	90
Size Exclusion (Gel Filtration)						
Bio-Gel P	B, C, E, SC	++++	++++		Separation of molecules by size; desalting and buffer exchange; several particle size ranges available with MW exclusion limits ranging from 100–100,000 D; pH stability 2–10	116
Bio-Beads S-X	B	++++	++++	++	Fractionation of low MW organic polymers and other hydrophobic substances in nonpolar solvents from 400–14,000 D	118
Affinity						
UNOsphere SUPrA	B, C, E	++++	+++		Antibody purification; Fc-fusion purification from large volumes of feed/cell culture; development and commercial-scale mAb purification process applications	109
Affi-Gel Protein A	B, C, GC	++++	++++		IgG purification from ascites, serum, and culture fluid; low-pressure resin	110
Affi-Prep Protein A	B, C, E	++++	++++	++	IgG purification from ascites, serum, and culture fluid; pressure-stable resin	110
Affi-Gel Blue	B, C, E, SC	++++	++++		Albumin removal and enzyme purification; Cibacron Blue F3GA dye covalently attached; purification of proteins with dinucleotide fold	111

continues

Chromatography Media Selection Guide

Media	Packing Format*	Suitability**			Application	Page
		Analytical Scale	Pilot/ Preparative Scale	Process Scale		
DEAE Affi-Gel Blue	B, C, E, GC	++++	++++		Albumin and protease removal for IgG purification; Cibacron Blue F3GA dye covalently attached to DEAE Bio-Gel A	111
CM Affi-Gel Blue	B	++++	++++		Albumin and protease removal for IgG purification; Cibacron Blue F3GA dye covalently attached to CM Bio-Gel A	112
Affi-Gel heparin	B	++++	++++		Purification of coagulation factors, plasma proteins, and enzymes including nucleases, lipases, and proteases; binding specific to a variety of enzymes and other proteins	114
Nuvia IMAC	B, C, E	++	++++	++++	Purification of recombinant histidine-tagged proteins; can be charged with other transition metals	102
Nuvia IMAC, uncharged	B, C, E	++	++++	++	Purification of recombinant histidine-tagged proteins; can be charged with other transition metals	102
Profinity IMAC	B, C, E	++++	++++	++	Histidine-tagged protein purification	104
Profinity GST	C, E	++++	++++	++	GST-tagged protein purification	105
Profinity eXact	B, C, E, SC	++++	++++	++	One-step affinity tag purification and on-column cleavage	106
Affi-Prep polymyxin	B	++++	++++	++++	Removal of endotoxins; pressure-stable resin capable of sanitization procedures with NaOH	113
Affi-Gel boronate	B	++++	++		Affinity for low MW molecules containing <i>cis</i> hydroxyl (cis-diol) groups; separation of AMP from cyclic AMP	113
Profinity epoxide	B	++++	++++	++++	Affinity coupling; coupling of nucleophiles such as hydroxy (-OH), amino (-NH ₂), or thiol (-SH) groups; based on UNOsphere base matrix for superb pressure flow characteristics	105
Affi-Gel 10	B	++++	++++		Affinity coupling; immobilization of ligands with -NH ₂ groups, coupling of proteins with pI 6.5–11; low-pressure resin	114
Affi-Gel 15	B	++++	++++		Affinity coupling; immobilization of ligands with -NH ₂ groups, coupling of proteins with pI <6.5; low-pressure resin	114
Affi-Gel Hz	B	++++	++++		Affinity coupling; immobilization of IgG molecules via their Fc region	115
Affi-Gel 102	B	++++	++++		Affinity coupling of ligands with -COOH groups via EDAC coupling chemistry	115
Mixed-Mode						
Nuvia aPrime 4A	B, E, F	++++	++++	++++	Biomolecule purification, a hydrophobic anion exchange resin	95
Nuvia cPrime	B, E, F	++++	++++	++++	Recombinant protein purification. Uses hydrophobic and weak cation exchange modes	95
CHT XT	B, E, F	++++	++++	++++	Antibody purification; virus purification/removal; DNA purification/removal; aggregate and endotoxin removal	97
CHT Type I	B, C, MC, E, F	++++	++++	++++	Antibody purification (higher capacity than Type II); virus purification/removal; DNA purification/removal; aggregate and endotoxin removal	97
CHT Type II	B, C, E, F	++++	++++	++++	Antibody purification; removal of albumin from feedstream; vaccine/VLP purification	97
MPC Type I	B, E, F	++++	++++	++++	Antibody purification; virus purification/removal; DNA purification/removal; aggregate and endotoxin removal; exhibits greater stability during pH excursions inherent in buffer exchanges	99
CFT Type II	B, E	++++	++++	++++	Similar properties to CHT but exhibits greater stability in the lower pH range (5.5)	99
Bio-Gel HT	B	++++	+++		Purification of proteins, nucleic acids, and other biomolecules; crystalline hydroxyapatite not as mechanically stable as CHT (ceramic hydroxyapatite)	101
Bio-Gel HTP	B	++++	+++		Similar to Bio-Gel HT but in powder form	101

continues

Chromatography Media Selection Guide

Media	Packing Format*	Suitability**			Application	Page
		Analytical Scale	Pilot/ Preparative Scale	Process Scale		
Hydrophobic Interaction						
DNA grade Bio-Gel HTP	B	++++	+++		Similar to Bio-Gel HTP with smaller particle size; selectivity for double-stranded DNA; of single- and double-stranded DNA separation	101
Macro-Prep methyl	B, E	++++	++++	++++	Separation of proteins based on relative hydrophobicity; pH stability 1–10	118
Macro-Prep t-butyl	B, E	++++	++++	++++	Separation of proteins based on relative hydrophobicity; pH stability 1–10	118
Bio-Beads SM-2	B	++++	++++	++++	Useful for the adsorption of nonpolar substances or surface active agents from aqueous solutions	119

* B, bottle; C, cartridge (1 or 5 ml); E, EconoFit columns; F, Foresight prepacked plates and columns; GC, gravity column; HPLC, high-pressure column; MC, medium-pressure column; SC, spin column. ** +, low suitability; ++, moderate suitability; +++, suitable; +++++, high suitability.

Ion Exchange Chromatography

See Also

Chromatography systems: page 148.
Prepacked columns: page 124.
Ion exchange chromatography standards: page 122.
Sample preparation products: page 1.
Resin sampler packs: page 120.
Bio-Scale Mini cartridges: page 132.
EconoFit columns and kits: page 127.

UNOsphere and Nuvia Ion Exchange Media

Bio-Rad's ion exchange resins are scalable and fast. They are designed to meet the needs of the biopharmaceutical industry for capture, intermediate, and polishing stages of purification. UNOsphere and Nuvia resins are bioprocess compatible and may also be used at laboratory scales for high-performance applications. Benefits include:

- Efficient capture from crude feedstreams
- Optimization to operate under 2 bar at 1,200 cm/hr
- Large-pore design results in ultra-high binding capacities at fast linear velocities
- Fully supported for regulatory information

UNOsphere Q and S Resins

UNOsphere Q and S resins are strong anion and cation exchange resins, respectively, and may be used at any stage of the purification process.

For More Information

Web: bio-rad.com/unosphere
Download bulletins: UNOsphere Q resin — 2724 and 2729;
UNOsphere S resin — 2669 and 2678

Nuvia Q, S, and HR-S Resins

Nuvia ion exchange resins are a family of next-generation ion exchange products built on an industry-proven proprietary base matrix technology. Nuvia resins provide very high capture and exceptional flow properties designed to meet current and future process needs. Nuvia Q and S are flexible alternatives that may be used as capture and/or polishing solutions. Nuvia HR-S is a high-resolution cation exchanger designed for intermediate and final polish applications.

- Use less resin to purify a given amount of product
- Reduce cycle time and increase productivity by operating at higher flow rates
- Reduce cost and space requirements by decreasing buffer consumption
- Reduce capital and operating expenses by using smaller columns
- Chemical stability for repetitive clean-in-place cycles
- Flexibility for capture or polish steps
- Fully supported for regulatory submission

Nuvia HP-Q Resin

Nuvia HP-Q is a strong anion exchange resin specifically designed for the high-throughput purification of large biomolecules. The large pores, optimized with surface extenders, together with the rigid base beads provide fast mass transfer kinetics at high flow rates for large biomolecule purification.

- Optimized surface extender/ligand density allows high dynamic binding capacity
- Favorable pressure flow characteristics at scale
- Base stability for excellent process economics

For More Information

Web: bio-rad.com/nuvia
Download bulletin: 5984
Request or download bulletins: 5987, 6128, 6129, 6241, and 6448

Properties of UNOsphere and Nuvia

Property	UNOsphere Q	UNOsphere S	Nuvia Q	Nuvia S	Nuvia HR-S	Nuvia HP-Q
Type of ion exchanger	Strong anion	Strong cation	Strong anion	Strong cation	Strong cation	Strong anion
Functional group	$-N^+(CH_3)_3$	$-SO_3^-$	$-N(CH_3)_3^+$	$-SO_3^-$	$-SO_3^-$	$-N(CH_3)_3^+$
Total ionic capacity	120 μ eq/ml	269 \pm 50 μ eq/ml	100–170 μ eq/ml	90–150 μ eq/ml	100–180 μ eq/ml	48–88 μ eq/ml
Mean particle size	120	80	85	85	50	50
Dynamic binding capacity ^{*,**}						
At 100 cm/hr	180 mg BSA/ml	60 mg IgG/ml	—	—	—	>50 mg/ml at 100 cm/hr ^{**}
At 300 cm/hr	—	—	>170 mg/ml	>110 mg/ml	\geq 70 mg/ml	—
At 600 cm/hr	125 mg BSA/ml	30 mg IgG/ml	—	—	—	—
Recommended linear flow rate range	50–300 cm/hr	50–300 cm/hr	50–600 cm/hr	50–300 cm/hr	50–200 cm/hr	50–300 cm/hr
pH stability (accelerated, 60°C)	1–14	1–14	2–14 short term 4–12 long term	2–14 short term 4–13 long term	2–14 short term 4–13 long term	2–13 short term 2–10 long term
Sanitization	0.5–1.0 N NaOH	0.5–1.0 N NaOH	0.5–1.0 N NaOH	0.5–1.0 N NaOH	0.5–1.0 N NaOH	1.5 N NaOH

* 10% breakthrough capacity determined with a 5.0 mg/ml human IgG and 5.0 mg/ml BSA in a 1.1 x 20 cm column.

** Nuvia HP-Q 10% breakthrough capacity determined with 1.1 mg/ml thyroglobulin in a 0.7 x 5.5 cm column.

Ordering Information

Catalog #	Description
1560311	Nuvia S Media , 25 ml
1560313	Nuvia S Media , 100 ml
156-0315	Nuvia S Media , 500 ml
156-0317	Nuvia S Media , 10 L
1560511	Nuvia HR-S Media , 25 ml
1560513	Nuvia HR-S Media , 100 ml
156-0515	Nuvia HR-S Media , 500 ml
156-0517	Nuvia HR-S Media , 10 L
1560411	Nuvia Q Media , 25 ml
1560413	Nuvia Q Media , 100 ml
156-0415	Nuvia Q Media , 500 ml
156-0417	Nuvia Q Media , 10 L
12006693	Nuvia HP-Q Media , 25 ml
12006691	Nuvia HP-Q Media , 100 ml
12006660	Nuvia HP-Q Media , 500 ml
12006659	Nuvia HP-Q Media , 5 L
12007023	Nuvia HP-Q Media , 10 L
1560101	UNOsphere Q Media , 25 ml
1560103	UNOsphere Q Media , 100 ml
156-0105	UNOsphere Q Media , 500 ml
156-0107	UNOsphere Q Media , 10 L
1560111	UNOsphere S Media , 25 ml
1560113	UNOsphere S Media , 100 ml
156-0115	UNOsphere S Media , 500 ml
156-0117	UNOsphere S Media , 10 L
Description	1 x 1 ml 5 x 1 ml 1 x 5 ml 5 x 5 ml
Prepacked Bio-Scale Mini Cartridges	
Nuvia S Media	7324420 7324421 7324422 7324423
UNOsphere Q Media	— 7324100 7324102 7324104
UNOsphere S Media	— 7324110 7324112 7324114

continues

Ordering Information

Catalog # Description

Foresight Plates*

732-4714	Foresight UNOsphere Q, 20 µl
732-4710	Foresight UNOsphere S, 20 µl
732-4703	Foresight Nuvia Q, 20 µl
732-4701	Foresight Nuvia S, 20 µl
732-4707	Foresight Nuvia HR-S, 20 µl
12006908	Foresight Nuvia HP-Q, 20 µl

Description

Catalog #

Catalog #

Foresight Columns

	1 ml	5 ml
Foresight UNOsphere Q	732-4732	732-4752
Foresight UNOsphere S	732-4730	732-4750
Foresight Nuvia Q	732-4721	732-4741
Foresight Nuvia S	732-4720	732-4740
Foresight Nuvia HR-S	732-4723	732-4743
Foresight Nuvia HP-Q	12007020	12007021

Foresight RoboColumn Units**

	200 µl	600 µl
Foresight UNOsphere Q	732-4819	732-4820
Foresight UNOsphere S	732-4813	732-4814
Foresight Nuvia Q	732-4804	732-4805
Foresight Nuvia S	732-4801	732-4802
Foresight Nuvia HR-S	732-4831	732-4832
Foresight Nuvia HP-Q	12007013	12007014

Catalog # Description

EconoFit Prepacked Ion Exchange Columns***

12009307	EconoFit UNOsphere Q Column, 1 x 1 ml, 7 mm x 25 mm
12009302	EconoFit UNOsphere Q Column, 1 x 5 ml, 16 mm x 25 mm
12009301	EconoFit UNOsphere Q Columns, 5 x 1 ml, 7 mm x 25 mm
12009303	EconoFit UNOsphere Q Columns, 5 x 5 ml, 16 mm x 25 mm
12009308	EconoFit UNOsphere S Column, 1 x 1 ml, 7 mm x 25 mm
12009305	EconoFit UNOsphere S Column, 1 x 5 ml, 16 mm x 25 mm
12009304	EconoFit UNOsphere S Columns, 5 x 1 ml, 7 mm x 25 mm
12009306	EconoFit UNOsphere S Columns, 5 x 5 ml, 16 mm x 25 mm
12009290	EconoFit Nuvia Q Column, 1 x 1 ml, 7 mm x 25 mm
12009291	EconoFit Nuvia S Column, 1 x 1 ml, 7 mm x 25 mm
12009284	EconoFit Nuvia HR-S Column, 1 x 1 ml, 7 mm x 25 mm
12009282	EconoFit Nuvia HP-Q Column, 1 x 1 ml, 7 mm x 25 mm

EconoFit Prepacked Column Kits

12009311	EconoFit Anionic IEX Kit, includes 1 ml each of Macro-Prep High Q, Macro-Prep High Q-3HT, UNOsphere Q, Nuvia Q, Macro-Prep DEAE, and Nuvia HP-Q
12009310	EconoFit Cationic IEX Kit, includes 1 ml each of Macro-Prep High S, UNOsphere S, Nuvia S, Nuvia HR-S, and Macro-Prep CM

Adaptor Fittings for Bio-Scale Mini Cartridges

7320111	Luer to M6 Adaptor Fittings Kit, includes luer to M6 fittings to connect 1 cartridge to an FPLC system
7320112	Luer to 10-32 Adaptor Fittings Kit, includes luer to 10-32 fittings to connect 1 cartridge to an HPLC or NGC system
7320113	Luer to BioLogic and NGC Systems Fittings Kit, low-pressure system fittings kit, includes 1/4-28 female to male and 1/4-28 female to female luers to connect 1 cartridge to BioLogic DuoFlow and NGC systems
7885010	Luer to 10-32 Adaptor Fittings Kit, includes female slip luer to female 10-32 fitting to connect male end of luer column to NGC system

* Package size: 2 x 96-well plates.

** Package size: 1 row of 8 columns.

*** Maximum pressure 72 psi.

See Also

Ion exchange chromatography standards: page 122.

Macro-Prep Ion Exchange Media

Macro-Prep ion exchange resins are designed to provide high resolution and high capacity for preparative separations. The rigid methacrylate beads exhibit little shrinkage or swelling, making them suitable for both low- and medium-pressure chromatography. The macroporous resin allows both small and large molecules to access exchange sites located throughout the chromatography bed. The physical structure of the resin permits high flow rates at low backpressure. Depending on the resin, pH conditions, and samples, the products can display mixed-mode behavior.

Benefits include:

- High capacity for biomolecules
- High resolution of complex biological mixtures
- Rigid methacrylate polymer matrix that allows high flow rates at modest pressures

Macro-Prep High Q, High Q-3HT, DEAE, High S, and CM Resins

For maximum flexibility, the product offerings include Macro-Prep High Q strong anion exchange resin, Macro-Prep DEAE weak anion exchange resin, Macro-Prep High S strong cation exchange resin, and Macro-Prep CM weak cation exchange resin.

For More Information

Web: bio-rad.com/macroprep

Download bulletins: [Macro-Prep DEAE resin — 1942](#);

[High S and High Q resins — 5643 and 5644](#)



Macro-Prep Resins

Bio-Scale Mini Macro-Prep Cartridges

Macro-Prep 25 Q and S Resins

Macro-Prep 25 Q strong anion exchange resin and Macro-Prep 25 S strong cation exchange resin offer high-resolution separations at high flow rates with medium pressures. Both resins possess the same rigid, macroporous, and hydrophilic properties of Macro-Prep High Q and High S resins, but in a 25 µm bead that offers higher resolution.

For More Information

Web: bio-rad.com/macroprepSandQ

Download bulletin: [2292](#)

Properties of Macro-Prep

Property	High Q	High Q-3HT	DEAE	High S	CM	25 Q*	25 S
Type of resin	Strong anion	Strong anion	Weak anion	Strong cation	Weak cation	Strong anion	Strong cation
Functional ligand	-N ⁺ (CH ₃) ₃	-N ⁺ (CH ₃) ₃	-N ⁺ (C ₂ H ₅) ₂	-SO ₃ ⁻	-COO ⁻	-N ⁺ (CH ₃) ₃	-SO ₃ ⁻
Ionic capacity	400 ± 75 µeq/ml	460 ± 60 µeq/ml	175 ± 75 µeq/ml	160 ± 40 µeq/ml	210 ± 40 µeq/ml	220 ± 40 µeq/ml	110 ± 30 µeq/ml
Typical binding capacity	≥37 mg BSA/ml	≥37 mg BSA/ml	≥30 mg BSA/ml	≥49 mg hlgG/ml	≥25 mg hemoglobin/ml	>30 mg BSA/ml	>40 IgG/ml
Counter ion	Cl ⁻	Cl ⁻	Cl ⁻	Na ⁺	Na ⁺	Cl ⁻	Na ⁺
Mean particle size**	50 µm	50 µm	50 µm	50 µm	50 µm	25 µm	25 µm
Recommended linear flow rate range	50–300 cm/hr	50–300 cm/hr	50–300 cm/hr	50–300 cm/hr	50–300 cm/hr	50–300 cm/hr	50–300 cm/hr
pH stability	1–10***	1–10***	1–10***	1–10***	1–12***	1–10***	1–10***
Storage conditions	20% ethanol	20% ethanol	20% ethanol	20% ethanol	20% ethanol	20% ethanol	20% ethanol

* Do not autoclave the OH⁻ form.

** Mean particle size measured before derivatization.

*** The use of basic reagents greater than pH 10 should be evaluated for each application.

Ordering Information

Catalog # Description

Macro-Prep High Q Media

1580040	Macro-Prep High Q Media, 25 ml	High-capacity strong anion exchange media; very high flow rates and resolution
1560040	Macro-Prep High Q Media, 100 ml	
156-0041	Macro-Prep High Q Media, 500 ml	
156-0042	Macro-Prep High Q Media, 5 L	
156-0043	Macro-Prep High Q Media, 10 L	

Macro-Prep High Q-3HT Media

1560040-3HT	Macro-Prep High Q-3HT Media, 100 ml	High-capacity strong anion exchange media; very high flow rates and resolution
1560041-3HT	Macro-Prep High Q-3HT Media, 500 ml	
1560042-3HT	Macro-Prep High Q-3HT Media, 5 L	
1560043-3HT	Macro-Prep High Q-3HT Media, 10 L	

Macro-Prep DEAE Media

1580020	Macro-Prep DEAE Media, 25 ml	High-capacity weak anion exchange media; very high flow rates and resolution
1560020	Macro-Prep DEAE Media, 100 ml	
156-0021	Macro-Prep DEAE Media, 500 ml	
156-0022	Macro-Prep DEAE Media, 5 L	
156-0023	Macro-Prep DEAE Media, 10 L	

Macro-Prep High S Media

1580030	Macro-Prep High S Media, 25 ml	High-capacity strong cation exchange media; very high flow rates and resolution
1560030	Macro-Prep High S Media, 100 ml	
156-0031	Macro-Prep High S Media, 500 ml	
156-0032	Macro-Prep High S Media, 5 L	
156-0033	Macro-Prep High S Media, 10 L	

Macro-Prep CM Media

1580070	Macro-Prep CM Media, 25 ml	High-capacity weak cation exchange media; high flow rates and resolution
1560070	Macro-Prep CM Media, 100 ml	
156-0071	Macro-Prep CM Media, 500 ml	
156-0073	Macro-Prep CM Media, 10 L	

Macro-Prep 25 Q Media

1530021	Macro-Prep 25 Q Media, 50 ml	Strong anion exchange media; 25 µm bead that offers higher resolution
1530022	Macro-Prep 25 Q Media, 200 ml	
153-0023	Macro-Prep 25 Q Media, 1 L	
153-0024	Macro-Prep 25 Q Media, 5 L	

Macro-Prep 25 S Media

1530031	Macro-Prep 25 S Media, 50 ml	Strong cation exchange media; 25 µm bead that offers higher resolution
1530032	Macro-Prep 25 S Media, 200 ml	
153-0033	Macro-Prep 25 S Media, 1 L	
153-0034	Macro-Prep 25 S Media, 5 L	

Catalog # Description

EconoFit Macro-Prep Columns*

12009273	EconoFit Macro-Prep CM Column, 1 x 1 ml, 7 x 25 mm
12009274	EconoFit Macro-Prep DEAE Column, 1 x 1 ml, 7 x 25 mm
12009265	EconoFit Macro-Prep DEAE Column, 1 x 5 ml, 16 x 25 mm
12009264	EconoFit Macro-Prep DEAE Columns, 5 x 1 ml, 7 x 25 mm
12009266	EconoFit Macro-Prep DEAE Columns, 5 x 5 ml, 16 x 25 mm
12009275	EconoFit Macro-Prep High Q Column, 1 x 1 ml, 7 x 25 mm
12009268	EconoFit Macro-Prep High Q Column, 1 x 5 ml, 16 x 25 mm
12009267	EconoFit Macro-Prep High Q Columns, 5 x 1 ml, 7 x 25 mm
12009269	EconoFit Macro-Prep High Q Columns, 5 x 5 ml, 16 x 25 mm
12009283	EconoFit Macro-Prep High Q-3HT Column, 1 x 1 ml, 7 x 25 mm
12009276	EconoFit Macro-Prep High S Column, 1 x 1 ml, 7 x 25 mm
12009271	EconoFit Macro-Prep High S Column, 1 x 5 ml, 16 x 25 mm
12009270	EconoFit Macro-Prep High S Columns, 5 x 1 ml, 7 x 25 mm
12009272	EconoFit Macro-Prep High S Columns, 5 x 5 ml, 16 x 25 mm
12009277	EconoFit Macro-Prep Methyl HIC Column, 1 x 1 ml, 7 x 25 mm
12009278	EconoFit Macro-Prep t-Butyl HIC Column, 1 x 1 ml, 7 x 25 mm

* Maximum pressure 72 psi

continues

Ordering Information

Catalog # Description

EconoFit Prepacked Column Kits

12009311 **EconoFit Anionic IEX Kit**, includes 1 ml each of Macro-Prep High Q, Macro-Prep High Q-3HT, UNOsphere Q, Nuvia Q, Macro-Prep DEAE, and Nuvia HP-Q

12009310 **EconoFit Cationic IEX Kit**, includes 1 ml each of Macro-Prep High S, UNOsphere S, Nuvia S, Nuvia HR-S, and Macro-Prep CM

Description	5 x 1 ml	1 x 5 ml	5 x 5 ml
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Prepacked Bio-Scale Mini Cartridges

Macro-Prep High Q Media	7324120	7324122	7324124
Macro-Prep High S Media	7324130	7324132	7324134
Macro-Prep DEAE Media	7324140	7324142	7324144

Catalog # Description

Adaptor Fittings for Bio-Scale Mini Cartridges

7320111 **Luer to M6 Adaptor Fittings Kit**, includes luer to M6 fittings to connect 1 cartridge to an FPLC system

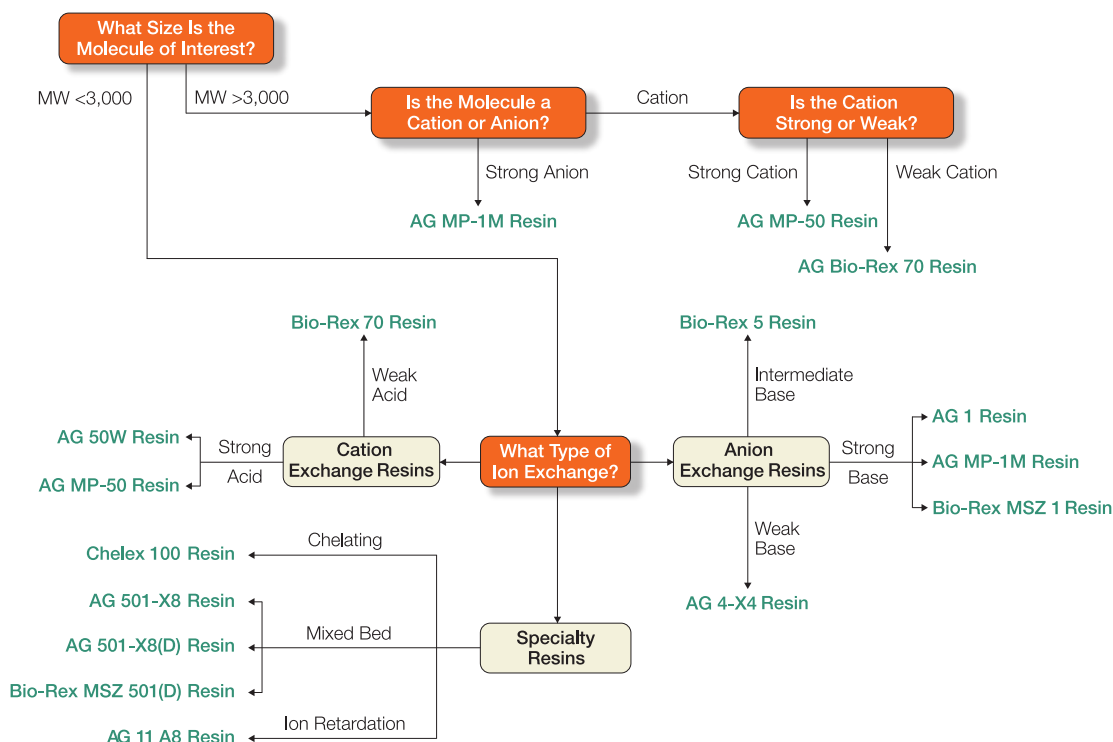
7320112 **Luer to 10-32 Adaptor Fittings Kit**, includes luer to 10-32 fittings to connect 1 cartridge to an HPLC or NGC system

7320113 **Luer to BioLogic and NGC Systems Fittings Kit**, low-pressure system fittings kit, includes 1/4-28 female to male and 1/4-28 female to female luers to connect 1 cartridge to BioLogic DuoFlow and NGC systems

7885010 **Luer to 10-32 Adaptor Fittings Kit**, includes female slip luer to female 10-32 fitting to connect male end of luer column to NGC system

Larger volumes and special packaging for industrial applications are available on request.

Analytical Grade Ion Exchange Chromatography



AG, Bio-Rex, and Chelex Resins

AG (analytical grade) resins — AG resins are primarily used for the separation of low MW compounds such as inorganic ions, organic acids, nucleic acids, or carbohydrates. They are available as both strong and weak cation and anion exchangers and as mixed-bed ion exchangers. Many are available in several ionic forms and can be converted from one form to another

- **AG 1-X8 strong anion exchanger resins** — useful for sample preparation, enzyme assays, metal separations, and peptide, protein, and nucleic acid separations
- **AG 50W-X8 strong cation exchanger resins** — particularly useful for the removal of ethidium bromide and propidium iodide from DNA samples

- **AG 501-X8 mixed-bed resins** — useful for deionization of water and nonelectrolyte solutions

Bio-Rex resin — available as weak anion and cation exchangers and as monosized mixed-bed ion exchangers. Bio-Rex 70 resins are macroreticular resins with a high capacity for high molecular weight compounds used for the purification and fractionation of proteins and peptides.

Chelex resins — contain paired iminodiacetate ions coupled to a styrene divinylbenzene support. They are unique chelating resins that bind polyvalent cations with high selectivity and are used to remove metal ions from samples and buffers.

Analytical Grade Resin Wet Mesh and Equivalent Diameters

Wet mesh (U.S. standard)	16	20	40	50	80	100	140	200	270	325	400
Diameter, μm	1,180	850	425	300	180	150	106	75	53	45	38

For More Information

Web: bio-rad.com/agresins

Request or download bulletin: 6904

See Also

Poly-Prep ion exchange columns: page 141.

Ordering Information

Catalog #	Description	Ionic Form	Dry Mesh Size	Wet Bead Size, μm	Nominal Shipping % Water
AG Resins					
140-1231	AG 1-X2 Resin, 500 g	Chloride	50–100	180–500	70–78
140-1241	AG 1-X2 Resin, 500 g	Chloride	100–200	106–250	70–78
140-1251	AG 1-X2 Resin, 500 g	Chloride	200–400	75–180	70–78
140-1253	AG 1-X2 Resin, 500 g	Acetate	200–400	75–180	70–78
140-1331	AG 1-X4 Resin, 500 g	Chloride	50–100	180–425	59–65
140-1341	AG 1-X4 Resin, 500 g	Chloride	100–200	106–250	59–65
140-1351	AG 1-X4 Resin, 500 g	Chloride	200–400	63–150	59–65
140-1421	AG 1-X8 Resin, 500 g	Chloride	20–50	300–1,180	39–45
140-1431	AG 1-X8 Resin, 500 g	Chloride	50–100	180–425	39–45
140-1441*	AG 1-X8 Resin, 500 g	Chloride	100–200	106–180	39–45
140-1451*	AG 1-X8 Resin, 500 g	Chloride	200–400	45–106	39–45
140-1422	AG 1-X8 Resin, 500 g	Hydroxide	20–50	300–1,180	39–45
140-1443	AG 1-X8 Resin, 500 g	Acetate	100–200	106–180	39–45
140-1453	AG 1-X8 Resin, 500 g	Acetate	200–400	45–106	39–45
140-1444	AG 1-X8 Resin, 500 g	Formate	100–200	106–180	39–45
140-1454	AG 1-X8 Resin, 500 g	Formate	200–400	45–106	39–45
142-1231	AG 50W-X2 Resin, 500 g	Hydrogen	50–100	300–1,180	75–83
142-1241*	AG 50W-X2 Resin, 500 g	Hydrogen	100–200	106–300	75–83
142-1251	AG 50W-X2 Resin, 500 g	Hydrogen	200–400	75–180	75–83
142-1331	AG 50W-X4 Resin, 500 g	Hydrogen	50–100	180–425	64–72
142-1341	AG 50W-X4 Resin, 500 g	Hydrogen	100–200	106–250	64–72
142-1351*	AG 50W-X4 Resin, 500 g	Hydrogen	200–400	63–150	64–72
142-1421	AG 50W-X8 Resin, 500 g	Hydrogen	20–50	300–1,180	50–56
142-1431	AG 50W-X8 Resin, 500 g	Hydrogen	50–100	180–425	50–56
142-1441***	AG 50W-X8 Resin, 500 g	Hydrogen	100–200	106–250	50–56
142-1451***	AG 50W-X8 Resin, 500 g	Hydrogen	200–400	63–150	50–56
142-1641	AG 50W-X12 Resin, 500 g	Hydrogen	100–200	106–250	42–48
142-1651	AG 50W-X12 Resin, 500 g	Hydrogen	200–400	53–106	42–48
141-1831	AG MP-1M Resin, 500 g	Chloride	50–100	150–300	56–64
141-1841	AG MP-1M Resin, 500 g	Chloride	100–200	75–150	56–64
141-1851	AG MP-1M Resin, 500 g	Chloride	200–400	38–75	56–64
143-0841	AG MP-50 Resin, 500 g	Hydrogen	100–200	75–150	46–52
140-4341*	AG 4-X4 Resin, 500 g	Free base	100–200	75–150	—
1437424*	AG 501-X8 Resin, 100 g	H ⁺ + OH ⁻	20–50	300–1,180	43–55
142-6424*****	AG 501-X8 Resin, 500 g	H ⁺ + OH ⁻	20–50	300–1,180	43–55
142-6425***	AG 501-X8(D) Resin, 500 g	H ⁺ + OH ⁻	20–50	300–1,180	43–55
142-7834*	AG 11 A8 Resin, 500 g	Self-adsorbed	50–100	180–425	—
Bio-Rex Resins					
140-7841	Bio-Rex 5 Resin, 500 g	Chloride	100–200	75–150	50–58
140-7851	Bio-Rex 5 Resin, 500 g	Chloride	200–400	45–75	50–58
142-5822	Bio-Rex 70 Resin, 500 g	Sodium	20–50	300–1,180	65–74
142-5832*	Bio-Rex 70 Resin, 500 g	Sodium	50–100	150–300	65–74
142-5842	Bio-Rex 70 Resin, 500 g	Sodium	100–200	75–150	65–74
142-5852*	Bio-Rex 70 Resin, 500 g	Sodium	200–400	45–75	65–74
142-7425*	Bio-Rex MSZ 501(D) Resin, 500 g	H ⁺ + OH ⁻	25–35	500–700	—
142-7426*	Bio-Rex MSZ 501(D) Resin, 10 kg	H ⁺ + OH ⁻	25–35	500–700	—

* Also available as biotechnology grade resin.

** Also available as molecular biology grade resin.

*** Also available as reactor grade resin.

continues

See Also

Ion exchange chromatography standards: page 122.

Ordering Information

Catalog #	Description	Ionic Form	Dry Mesh Size	Wet Bead Size, μm	Nominal Shipping % Water
Chelex Resins					
142-2822	Chelex 100 Resin , 500 g	Sodium	50–100	300–1,180	68–76
142-2832*	Chelex 100 Resin , 500 g	Sodium	100–200	150–300	68–76
142-2842**	Chelex 100 Resin , 500 g	Sodium	200–400	75–150	68–76
142-2843	Chelex 100 Resin , 10 kg	Sodium	200–400	75–150	68–76
1422825	Chelex 100 Resin , 100 g	Iron	100–200	150–300	—
142-2827	Chelex 100 Resin , 1 kg	Iron	100–200	150–300	—
142-2826	Chelex 100 Resin , 10 kg	Iron	100–200	150–300	—
Catalog #	Description				

AG Resins in Larger Volumes and Special Packaging for Industrial Applications

140-1256	AG 1-X2 Resin , acetate, 200–400 mesh, 1 kg
140-1255	AG 1-X2 Resin , acetate, 200–400 mesh, 10 kg
140-1342	AG 1-X4 Resin , chloride, 100–200 mesh, 10 kg
140-1447	AG 1-X8 Resin , acetate, 20–50 mesh, 10 kg
140-1446	AG 1-X8 Resin , acetate, 100–200 mesh, 10 kg
140-1425	AG 1-X8 Resin , chloride, 20–50 mesh, 1 kg
140-1457	AG 1-X8 Resin , chloride, 100–200 mesh, 5 kg
140-1426	AG 1-X8 Resin , chloride, 20–50 mesh, 10 kg
140-1432	AG 1-X8 Resin , chloride, 50–100 mesh, 10 kg
140-1842	AG 1-X8 Resin , chloride, 100–200 mesh, 10 kg
140-1456	AG 1-X8 Resin , chloride, 200–400 mesh, 10 kg
140-1445	AG 1-X8 Resin , chloride, 100–200 mesh, 10 kg
140-1424	AG 1-X8 Resin , hydroxide, 20–50 mesh, 10 kg
140-2423	AG 2-X8 Resin , chloride, 20–50 mesh, 10 kg
140-2341	AG 4-X4 Resin , free base, 100–200 mesh, 5 kg
142-1232	AG 50W-X2 Resin , hydrogen, 50–100 mesh, 10 kg
142-1242	AG 50W-X2 Resin , hydrogen, 100–200 mesh, 10 kg
142-1424	AG 50W-X8 Resin , ultrapure, hydrogen, 20–50 mesh, 10 kg
142-1423	AG 50W-X8 Resin , hydrogen, 20–50 mesh, 10 kg
142-1432	AG 50W-X8 Resin , hydrogen, 50–100 mesh, 10 kg
142-1442	AG 50W-X8 Resin , hydrogen, 100–200 mesh, 10 kg
142-1452	AG 50W-X8 Resin , hydrogen, 200–400 mesh, 10 kg
142-1254	AG 50W-X12 Resin , hydrogen, 200–400 mesh, 1 kg
141-1842	AG MP-1M Resin , chloride, 100–200 mesh, 10 kg
141-1852	AG MP-1M Resin , chloride, 200–400 mesh, 10 kg
141-1853	AG MP-1M Resin , nitrate, 200–400 mesh, 10 kg
142-6427	AG 501-X8 Resin , $\text{H}^+ + \text{OH}^-$, 20–50 mesh, 10 kg
143-6426**	AG 501-X8 Resin , $\text{H}^+ + \text{OH}^-$, 20–50 mesh, 10 kg
143-7428*	AG 501-X8 Resin , $\text{H}^+ + \text{OH}^-$, 20–50 mesh, 10 kg
143-6427***	AG 501-X8(D) Resin , $\text{H}^+ + \text{OH}^-$, 20–50 mesh, 10 kg

continues

Ordering Information

Catalog#	Description	Particle Size, μm	Ionic Form	Application
Prepacked Poly-Prep Ion Exchange Columns				
7316211	Poly-Prep Columns , AG 1-X8 resin, 100–200 mesh, 50	106–180	Chloride	Separation of low molecular weight inorganic anions
7316212	Poly-Prep Columns , AG 1-X8 resin, 200–400 mesh, 50	45–106	Chloride	For high-resolution general purpose separations
7316221	Poly-Prep Columns , AG 1-X8 resin, 200–400 mesh, 50	45–106	Formate	Separation of low molecular weight biological compounds such as carboxylic acids
7316213	Poly-Prep Columns , AG 50W-X8 resin, 100–200 mesh, 50	106–250	Hydrogen	Separation and concentration of low molecular weight cations such as small peptides and amino acids
7316214	Poly-Prep Columns , AG 50W-X8 resin, 200–400 mesh, 50	63–150	Hydrogen	For high-resolution general purpose separations

* Also available as biotechnology grade resin.

** Also available as molecular biology grade resin.

*** Molecular biology grade resin; also available in biotechnology grade.

Technical and Reactor Grade Resins

Bio-Rad offers reactor grade Bio-Rex RG 501-X8 resins for power plant deionization systems and large-scale cleanup of metals from waste water.

For More Information

Web: bio-rad.com/agresins

Ordering Information

Catalog #	Description	Ionic Form	Dry Mesh Size	MW Exclusion
Technical and Reactor Grade Resins				
444-9998*	Bio-Rex RG 501-X8 Resin , 1 ft ³ , for water purification	H ⁺ + OH ⁻	20–50	1,000
444-9999	Bio-Rex RG 501-X8 Resin , 500 g	H ⁺ + OH ⁻	20–50	1,000

* 1 ft³ corresponds to approximately 20 kg. Larger volumes and special packaging are available on request.

Molecular Biology and Biotechnology Grade Resins

- **Molecular biology grade resins** — are chemically identical to the equivalent analytical grade resins and are certified to be free of endo- and exonuclease activities and ligase inhibitors
- **Biotechnology grade resins** — undergo special processing and contain fewer than 100 microorganisms/gram

For More Information

Web: bio-rad.com/agresins

Request or download bulletins: 6904, 6905, 6906, 6907, and 6908

Ordering Information

Catalog #	Description	Dry Mesh Ionic Form	Wet Bead Size	Size, μm	Application
Molecular Biology Grade Resins					
1436424	AG 501-X8 Resin , molecular biology grade, 100 g	H ⁺ + OH ⁻	20–50	300–1,180	Deionization
1436425	AG 501-X8(D) Resin , molecular biology grade, 100 g	H ⁺ + OH ⁻	20–50	300–1,180	~1,000 MW limit
1421253	Chelex 100 Resin , molecular biology grade, 50 g	Sodium	200–400	75–150	DNA extraction for PCR sample preparation
Biotechnology Grade Resins					
1431255	AG 1-X2 Resin , biotechnology grade, 100 g	Hydroxide	200–400	75–180	Separation of small peptides, nucleotides, and large metal complexes
1431345	AG 1-X4 Resin , biotechnology grade, 100 g	Hydroxide	100–200	63–150	Separation of organic acids, nucleotides, phosphoinositides, and other anions
1432445	AG 1-X8 Resin , biotechnology grade, 100 g	Hydroxide	100–200	106–180	Separation of inorganic and organic anions with MW <1,000
1432446	AG 1-X8 Resin , biotechnology grade, 100 g	Hydroxide	200–400	45–106	
1435241	AG 50W-X2 Resin , biotechnology grade, 100 g	Hydrogen	100–200	106–300	Separation of peptides, nucleotides, and cations
1435341	AG 50W-X4 Resin , biotechnology grade, 100 g	Hydrogen	200–400	75–150	Separation of amino acids, nucleotides, and cations
1435441	AG 50W-X8 Resin , biotechnology grade, 100 g	Hydrogen	100–200	106–250	Separation of amino acids and cations
1435451	AG 50W-X8 Resin , biotechnology grade, 100 g	Hydrogen	200–400	63–150	
1437834	AG 11 A8 Resin , biotechnology grade, 100 g	Self-adsorbed	50–100	180–425	Removal of ionic compounds
1437424	AG 501-X8 Resin , biotechnology grade, 100 g	H ⁺ + OH ⁻	20–50	300–1,180	Deionization
1437425	AG 501-X8(D) Resin , biotechnology grade, 100 g	H ⁺ + OH ⁻	20–50	300–1,180	
1432832	Chelex 100 Resin , biotechnology grade, 100 g	Sodium	100–200	150–300	PCR sample preparation
1435832	Bio-Rex 70 Resin , biotechnology grade, 100 g	Sodium	50–100	150–300	Separation of cationic proteins and amines
1435852	Bio-Rex 70 Resin , biotechnology grade, 100 g	Sodium	200–400	45–75	
1528920	Bio-Beads SM-2 , 25 g	—	—	—	Detergent removal
1523920	Bio-Beads SM-2 , 100 g	—	—	—	Detergent removal

Mixed-Mode Chromatography

Mixed-mode media offer unique separation properties and unparalleled selectivity and resolution for a variety of molecules. These products can be used at any stage in a process from initial capture to final polishing.

Nuvia Mixed-Mode Resin

Nuvia aPrime 4A anion exchange resin and Nuvia cPrime cation exchange resin are part of Bio-Rad's family of mixed-mode purification products. These resins are designed for process-scale purification of a wide variety of therapeutic proteins.

Nuvia mixed-mode resins deliver value by providing:

- Unique selectivity
- Simple method development
- Large design space for capture and elution of a variety of biotherapeutic proteins
- High recovery of target protein
- Mechanical and chemical stability

Nuvia aPrime 4A Hydrophobic Anion Exchange Resin

Nuvia aPrime 4A resin is designed to provide optimal efficiency and productivity for process scale purification of therapeutic proteins. The resin's ligand density and hydrophobicity are engineered to facilitate selective and reversible binding of target molecules for high purity and yield. Nuvia aPrime 4A resin can be used for both capture and polish purification. It offers a wide design space and straightforward method development to purify even the most complex molecules.

Properties of Nuvia aPrime 4A and Nuvia cPrime

Property	Nuvia aPrime 4A	Nuvia cPrime
Functional group	Aromatic hydrophobic anion exchanger	Aromatic hydrophobic weak cation exchanger
Mean particle size	50	70
Dynamic binding capacity	≥50 mg/ml at 300 cm/hr*	hlgG: >40 mg/ml (at 10% breakthrough, 300 cm/hr)
Ligand density	100 ± 20 µeq/ml	123 ± 20 µeq/ml
Recommended linear flow rate range	50–300 cm/hr	50–600 cm/hr
pH stability**	Short term: 2–14	1–14 short term 3–13 long term
Chemical stability†	1 N NaOH, 1 M HCl, 25% acetic acid, 8 M urea, 6 M guanidine HCl, 3 M NaCl, 1% Triton X-100, 20–70% ethanol, 30% isopropanol	25% acetic acid, 8 M urea, 6 M guanidine-HCl, 6 M potassium thiocyanate, 3 M sodium chloride, 1% Triton X-100, 2% SDS, 70% ethanol, 30% isopropyl alcohol
Shipping solution	20% ethanol + 1 M NaCl	20% ethanol, 30 mM Na ₂ SO ₃
Storage conditions	20% ethanol	0.1 M NaOH

* 10% breakthrough capacity determined with 1.0 mg/ml of an acidic monoclonal antibody (mAb; pI ~6.9) in 20 mM NaPO₄, pH 7.8.

** No significant change in ligand density after 200 hr contact at 22°C.

† No significant change in ligand density after 1 week contact at 22°C.

Nuvia cPrime Hydrophobic Cation Exchange Resin

Nuvia cPrime resin's unique selectivity allows method developers to use hydrophobic and cation exchange interaction modes to achieve effective purification. Importantly, the resin has a large design space for binding and elution, allowing for the development of highly robust methods in a commercial manufacturing setting. Nuvia cPrime is built on a rigid, mechanically and chemically stable macroporous base matrix with a particle size optimized to deliver exceptional flow properties, fast mass transfer, and stability.

For More Information

Web: bio-rad.com/nuvia
bio-rad.com/aprime

Request or download bulletins: 6241, 6242, and 6418

See Also

Resin sampler packs:
page 120.

Foresight prepacked
plates and columns:
pages 86, 130, 177.

Ordering Information

Catalog # Description

Nuvia cPrime Media

1563401	Nuvia cPrime Media, 25 ml
1563402	Nuvia cPrime Media, 100 ml
156-3403	Nuvia cPrime Media, 500 ml
156-3404	Nuvia cPrime Media, 1 L
156-3405	Nuvia cPrime Media, 5 L
156-3406	Nuvia cPrime Media, 10 L

Nuvia cPrime Foresight Plates, Columns, and RoboColumn Units

732-4705*	Foresight Nuvia cPrime Plates, 20 µl
732-4722	Foresight Nuvia cPrime Column, 1 ml
732-4742	Foresight Nuvia cPrime Column, 5 ml
732-4807**	Foresight Nuvia cPrime RoboColumn Unit, 200 µl
732-4808**	Foresight Nuvia cPrime RoboColumn Unit, 600 µl

Nuvia aPrime 4A Media

12007397	Nuvia aPrime 4A Media, 25 ml
12007396	Nuvia aPrime 4A Media, 100 ml
12007379	Nuvia aPrime 4A Media, 500 ml
12007380	Nuvia aPrime 4A Media, 5 L
12007391	Nuvia aPrime 4A Media, 10 L

Foresight Nuvia aPrime 4A Plates, Columns, and RoboColumn Units

12007411	Foresight Nuvia aPrime 4A Plates, 20 µl
12007392	Foresight Nuvia aPrime 4A Column, 1 ml
12007393	Foresight Nuvia aPrime 4A Column, 5 ml
12007394	Foresight Nuvia aPrime 4A RoboColumn, 200 µl
12007395	Foresight Nuvia aPrime 4A RoboColumn, 600 µl

EconoFit Columns

12009281	EconoFit Nuvia cPrime Column, 1 x 1 ml, 7 x 25 mm, maximum pressure 72 psi
12009280	EconoFit Nuvia aPrime 4A Column, 1 x 1 ml, 7 x 25 mm, maximum pressure 72 psi

EconoFit Prepacked Column Kits

12009315	EconoFit Aggregate Clearance Kit , includes one 1 ml each of Nuvia cPrime, Nuvia aPrime 4A, Nuvia HR-S, CHT XT
12009314	EconoFit Large Biomolecule Kit , includes 1 ml each of Nuvia Q; Nuvia HP-Q; Nuvia cPrime; Nuvia aPrime 4A; CHT II, 40 µm; and CHT XT
12009313	EconoFit mAb Kit , includes 1 ml each of Nuvia S, Nuvia Q, Nuvia cPrime, Nuvia aPrime 4A, Nuvia HR-S, and CHT XT

* Package size: 2 x 96-well plates.

** Package size: 1 row of 8 columns.

Hydroxyapatite ($\text{Ca}_5(\text{PO}_4)_3\text{OH}$)₂ and fluoroapatite $\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$ are forms of calcium phosphate that offer unique selectivities and often separate biomolecules that appear homogeneous when other chromatographic and electrophoretic techniques are used. Hydroxyapatite and fluoroapatite chromatography can be used at any stage from initial capture to final polishing.

Ceramic Hydroxyapatites

CHT ceramic hydroxyapatite is a spherical, macroporous, and chemically pure form of hydroxyapatite that has been sintered at high temperatures to yield a physically and chemically robust support. It gives consistent, reproducible results over many cycles at scales up to 1.8 m, making CHT ceramic hydroxyapatite ideal for large-scale bioprocess applications. It has unique separation properties and unmatched selectivity and resolution. Applications include the purification of enzymes, antibody fragments, bispecific antibodies, and monoclonal and polyclonal antibodies of various classes; separation of supercoiled DNA from linear duplexes as well as single-stranded from double-stranded DNA; and efficient isolation and purification of viruses and virus-like particles. CHT ceramic hydroxyapatite is available in three distinct versions: Type I, XT, and Type II. The three types differ in their pore diameters and can differ slightly in protein separation,

offering flexibility to select the type that provides maximum benefit in a given separation. CHT Type I and XT, with their smaller pore diameter and larger surface area, have higher binding capacities than CHT Type II. CHT Type II with its larger pore diameter provides higher capacity for large molecules, such as IgM and virus particles.

- High throughput
- High physical and chemical stability
- Unmatched selectivity
- Single-step clearance of impurities and aggregates
- Rapid and simple column packing

For More Information

Web: bio-rad.com/cht
bio-rad.com/chtxt
Request or download bulletins: 5667, 5709, 5853, 6086, 6549, and 7080

See Also

Foresight prepacked plates and columns: pages 86, 130, 177.

Specifications

	CHT Type I, 40 μm	CHT Type II, 40 μm	CHT XT, 40 μm
Functional groups	Ca^{2+} , PO_4^{3-} , OH^-	Ca^{2+} , PO_4^{3-} , OH^-	Ca^{2+} , PO_4^{3-} , OH^-
Observed dynamic binding capacity, lysozyme	25–40 mg lysozyme/g*	12.5–20 g lysozyme/g*	17.4–24.8 mg lysozyme/g*
Mean particle size	40	40	40
Tap settled density* (g/ml tap settled bed)	0.63 g/ml	0.63 g/ml	0.67 g/ml

* Under ideal conditions.

Properties of CHT

Property	CHT Type I, 40 μm	CHT Type II, 40 μm	CHT XT
Observed dynamic binding capacity, IgG*	25–60 mg IgG/ml	15–25 mg IgG/ml	>60 mg/ml mAb G** (pI 9.2)
Typical linear flow rate	50–400 cm/hr	50–400 cm/hr	50–400 cm/hr
pH stability	6.5–14	6.5–14	6.5–14
Regeneration	500 mM sodium phosphate pH 7; 1 M trisodium phosphate, pH 11–12	500 mM sodium phosphate pH 7; 1 M trisodium phosphate, pH 11–12	0.4–0.5 M sodium phosphate, pH 7.0–7.5; 1 M trisodium phosphate, pH 11–12. If higher concentrations of sodium phosphate are needed, use 0.4–1.0 M potassium phosphate.
Autoclavability (bulk)	121°C, 20 min in phosphate buffer, pH 7	121°C, 20 min in phosphate buffer, pH 7	121°C, 20 min in phosphate buffered saline, pH 7
Sanitization	1–2 N NaOH	1–2 N NaOH	1–2 N NaOH
Recommended column storage	.01 N NaOH	.01 N NaOH	0.1 N NaOH

* At 500 cm/hr with 10 mM sodium phosphate, pH 6.8.

** At 100 cm/hr with 5 mM sodium phosphate, 25 mM sodium chloride, pH 7 in a 0.5 x 9.5 cm column

Ordering Information

Description	Type I	Type II	XT
CHT Ceramic Hydroxyapatite, 20 µm			
20 µm particle size, 10 g	1582000	1582200	—
20 µm particle size, 100 g	1570020	1572000	—
20 µm particle size, 1 kg (1.6 L)	157-0021	157-2100	—
CHT Ceramic Hydroxyapatite, 40 µm			
40 µm particle size, 10 g	1584000	1584200	12002457
40 µm particle size, 100 g	1570040	1574000	12002454
40 µm particle size, 1 kg (1.6 L)	157-0041	157-4100	12002456
40 µm particle size, 5 kg (7.9 L)	157-0045	157-4500	12002455
CHT Ceramic Hydroxyapatite, 80 µm			
80 µm particle size, 10 g	1588000	1588200	—
80 µm particle size, 100 g	1570080	1578000	—
80 µm particle size, 1 kg (1.6 L)	157-0081	157-8100	—
80 µm particle size, 5 kg (7.9 L)	157-0085	157-8500	—
Foresight CHT Plates, Columns, and RoboColumn Units			
Foresight CHT Plates, 40 µm, 20 µl*	732-4716	732-4718	12003151
Foresight CHT Column, 40 µm, 1 ml	732-4735	732-4736	12003150
Foresight CHT Column, 40 µm, 5 ml	732-4755	732-4756	12003149
Foresight CHT RoboColumn Unit, 40 µm, 200 µl**	732-4822	732-4825	12003152
Foresight CHT RoboColumn Unit, 40 µm, 600 µl**	732-4823	732-4826	12003148

Catalog # Description

EconoFit CHT Columns***

12009255	EconoFit CHT Type I, 40 µm Column, 1 x 1 ml, 7 x 25 mm
12009253	EconoFit CHT Type I, 40 µm Column, 1 x 5 ml, 16 x 25 mm
12009254	EconoFit CHT Type I, 40 µm Columns, 5 x 5 ml, 16 x 25 mm
12009256	EconoFit CHT Type I, 80 µm Column, 1 x 1 ml, 7 x 25 mm
12009259	EconoFit CHT Type II, 40 µm Column, 1 x 1 ml, 7 x 25 mm
12009257	EconoFit CHT Type II, 40 µm Column, 1 x 5 ml, 16 x 25 mm
12009258	EconoFit CHT Type II, 40 µm Columns, 5 x 5 ml, 16 x 25 mm
12009260	EconoFit CHT Type II, 80 µm Column, 1 x 1 ml, 7 x 25 mm
12009261	EconoFit CHT XT Column, 1 x 1 ml, 7 x 25 mm

Description

1 x 5 ml

5 x 5 ml

CHT Prepacked Bio-Scale Mini Cartridges

CHT Type I Ceramic Hydroxyapatite	7324322	7324324
CHT Type II Ceramic Hydroxyapatite	7324332	7324334

Catalog # Description

Bio-Scale Purification Kits

7324407	Bio-Scale Mini Apatite Purification Kit , CHT Type II cartridge, CFT Type II cartridge, 1 x 5 ml each
7324408	Bio-Scale Mini mAb Purification Kit , UNOsphere SUPrA affinity cartridge, UNOsphere Q cartridge, CHT Type I cartridge, 1 x 5 ml each

EconoFit Application Kits

12009315	EconoFit Aggregate Clearance Kit , includes 1 ml each of Nuvia cPrime, Nuvia aPrime 4A, Nuvia HR-S, CHT XT
12009309	EconoFit CHT Kit , includes 1 ml each of CHT I, 40 µm; CHT II, 40 µm; MPC I, 40 µm; and CFT II, 40 µm
12009314	EconoFit Large Biomolecule Kit , includes 1 ml each of Nuvia Q; Nuvia HP-Q; Nuvia cPrime; Nuvia aPrime 4A; CHT II, 40 µm; and CHT XT
12009313	EconoFit mAb Kit , includes 1 ml each of Nuvia S, Nuvia Q, Nuvia cPrime, Nuvia aPrime 4A, Nuvia HR-S, and CHT XT

Larger volumes and special packaging for industrial applications are available on request.

* Package size: 2 x 96-well plates.

** Package size: 1 row of 8 columns.

*** Maximum pressure 72 psi.

Ceramic Fluoroapatites

MPC Ceramic Hydroxyfluoroapatite

MPC ceramic hydroxyfluoroapatite $\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_{1.5}(\text{F})_{0.5}$ is a complementary addition to our line of ceramic apatite mixed-mode chromatography media. MPC is a composite of hydroxyapatite and fluoroapatite, which confers greater pH stability. MPC has the unique separation properties and unmatched selectivity and resolution of CHT.

CFT Ceramic Fluoroapatite

CFT ceramic fluoroapatite ($\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$) is a rigid spherical macroporous media used in the purification of biologically significant compounds. CFT is a composite of fluoroapatite and hydroxyapatite prepared by chemically converting hydroxyapatite nanocrystals to fluoroapatite with a fluorine reagent. CFT can be used under stringent chromatography requirements to separate acidic proteins requiring buffered conditions as low as pH 5.6.

Specifications

	MPC	CFT
Functional groups	Ca^{2+} , PO_4^{3-} , OH^- , F^-	Ca^{2+} , PO_4^{3-} , F^-
Observed dynamic binding capacity lysozyme	≥ 25 mg lysozyme/g	14–21.5 mg lysozyme/g
Mean particle size	40	40
Tap settled density* (g/ml tap settled bed)	0.72 g/ml	0.86 g/ml

* Under ideal conditions.

Properties of MPC and CFT

Property	MPC	CFT*
Observed dynamic binding capacity IgG	25–50 mg IgG/ml**	33 mg IgG/ml
Typical linear flow rate range	50–300 cm/hr	50–300 cm/hr
pH stability	6.5–14	5–14
Chemical stability	1 M NaOH, 8 M urea, 6 M guanidine-HCl, ethanol	2 M NaOH, 6 M guanidine-HCl, 8 M urea, 0.1 M sodium acetate, pH 5.7
Autoclavability (bulk)	121°C, 20 min in phosphate buffer, pH 7	121°C, 20 min
Sanitization	1–2 N NaOH	1–2 M NaOH or KOH
Recommended column storage	0.1 N NaOH	0.1 N NaOH or KOH

* A small amount (up to 5 mM) of sodium phosphate should be added to all unbuffered solutions as a counterion.

** 40 μm particles, 300 cm/hr, 5 mM sodium phosphate, 25 mM NaCl, pH 6.5.

For More Information

Web: bio-rad.com/mpc
bio-rad.com/cft

Request or download bulletins: 6432 and 6086 (MPC); 3111 and 5853 (CFT)

Ordering Information

Catalog #	Description
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MPC Ceramic Hydroxyfluorapatite, 40 µm

1580200	40 µm particle size, 10 g
1570200	40 µm particle size, 100 g
157-0201	40 µm particle size, 1 kg (1.4 L)
157-0205	40 µm particle size, 5 kg (6.9 L)

MPC Foresight Plates, Columns, and RoboColumn Units

732-4785	Foresight MPC Type I Plates, 20 µl*
732-4737	Foresight MPC Type I Column, 40 µm, 1 ml
732-4757	Foresight MPC Type I Column, 40 µm, 5 ml
732-4828	Foresight MPC Type I RoboColumn Unit, 40 µm, 200 µl**
732-4829	Foresight MPC Type I RoboColumn Unit, 40 µm, 600 µl**

CFT Ceramic Fluorapatite

1585200	40 µm particle size, 10 g
1575000	40 µm particle size, 100 g
157-5100	40 µm particle size, 1 kg (1.2 L)
157-5500	40 µm particle size, 5 kg (5.8 L)

EconoFit Columns***

12009279	EconoFit MPC I-40 Column, 1 x 1 ml, 7 x 25 mm
12009252	EconoFit CFT Type II, 40 µm Column, 1 x 1 ml, 7 x 25 mm
12009240	EconoFit CFT Type II, 40 µm Column, 1 x 5 ml, 16 x 25 mm
12009251	EconoFit CFT Type II, 40 µm Columns, 5 x 5 ml, 7 x 25 mm

Description	1 x 5 ml	5 x 5 ml
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CFT Prepacked Bio-Scale Mini Cartridges

CFT Type II Ceramic Fluorapatite	7324405	7324406
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Catalog #	Description
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Application Kits

7324407	Bio-Scale Mini Apatite Purification Kit, CHT Type II cartridge, CFT Type II cartridge, 1 x 5 ml each
7324408	Bio-Scale Mini mAb Purification Kit, UNOsphere SUPrA affinity cartridge, UNOsphere Q cartridge, CHT Type I cartridge, 1 x 5 ml each
12009309	EconoFit CHT Kit, includes 1 ml each of CHT I, 40 µm; CHT II, 40 µm; MPC I, 40 µm; and CFT II, 40 µm

* Package size: 2 x 96-well plates.

** Package size: 1 row of 8 columns.

*** Maximum pressure 72 psi.

Bio-Gel Hydroxyapatite HT and HTP

Hydroxyapatite ($\text{Ca}_5(\text{PO}_4)_3\text{OH}$)₂ is a form of calcium phosphate used in the chromatographic separation of biomolecules. Bio-Gel crystalline hydroxyapatite media is compatible with a wide range of aqueous buffers and organic modifiers and can be sanitized in up to 1 M NaOH. Typical pH tolerance is >6.8, however it can be used at 5.5 in single-use applications. Bio-Gel hydroxyapatite can be autoclaved in buffers that maintain a pH above 7 during the autoclaving cycle.

- **Bio-Gel HT media** — shipped in 10 mM sodium phosphate, pH 6.8 buffer containing 0.02% NaN_3 . The flow rate range is 25–100 cm/hr at 10 cm bed height in a gravity-packed column. Bio-Gel HT media has a shelf life of at least one year when stored at 4°C in the shipping buffer
- **Bio-Gel HTP powder** — the dry form of Bio-Gel HT media. When hydrated, it should be stored similarly to Bio-Gel HT media; the flow rate range is similar to Bio-Gel HT media
- **DNA grade Bio-Gel HTP powder** — a smaller particle size version of Bio-Gel HTP powder, it exhibits higher capacity for biomolecules. It is generally used for single- and double-stranded DNA separations. It has an increased capacity for RNA, making it useful for DNA-RNA hybridization studies. Its flow rate is limited in gravity feed columns, but it can be used in medium-pressure columns to enhance flow rate



Bio-Gel HT and HTP

Properties of Bio-Gel HT and HTP

Property	Bio-Gel HT	Bio-Gel HTP	Bio-Gel HTP (DNA Grade)
Flow rate,* cm/hr	>25	>25	>5
BSA adsorbed,** mg per dry gram	10	10	10
Calf thymus DNA adsorbed, µg per dry gram	>500	>500	>800
Hydrated volume	—	2–3 ml/g	2–3 ml/g

* Flow rate determined on a 1.5 x 10 cm column with 40 cm hydrostatic pressure.

** Batch-wise uptake.

For More Information

Web: bio-rad.com/biogelHTandHTP

Download bulletin: LIT217

See Also

CHT ceramic hydroxyapatite: page 97.

Bio-Scale Mini CHT cartridges: page 132.

Bio-Scale CHT Type I columns: page 136.

Ordering Information

Catalog #	Description
1300150	Bio-Gel HT Hydroxyapatite , hydrated, 250 ml
130-0151	Bio-Gel HT Hydroxyapatite , hydrated, 500 ml
1300420	Bio-Gel HTP Hydroxyapatite , powder, 100 g
130-0421	Bio-Gel HTP Hydroxyapatite , powder, 1 kg
130-0425	Bio-Gel HTP Hydroxyapatite , powder, 5 kg
1300520	Bio-Gel HTP Hydroxyapatite , DNA grade, 100 g

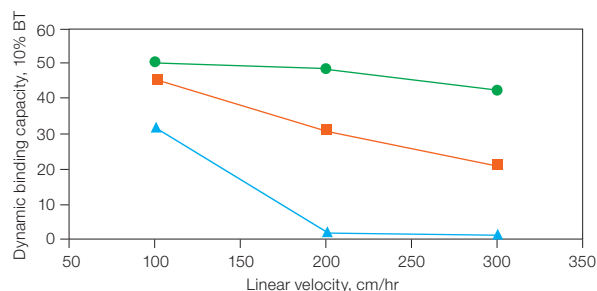
Affinity Chromatography

Nuvia IMAC Resin

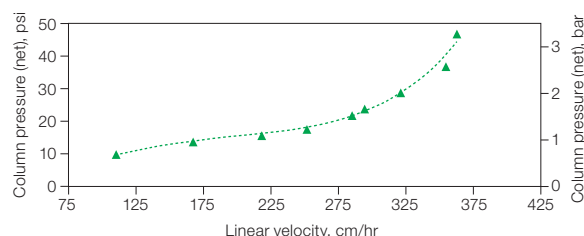
Nuvia IMAC resin is a high-capacity, next-generation metal chelate affinity chromatography resin. Nuvia IMAC delivers high binding capacity over a range of pH and flow rates, providing wide experimental design space for many applications. Immobilized metal affinity chromatography (IMAC) is a powerful purification technique that relies on the affinity that the histidine tag has for immobilized transition metals. Nuvia IMAC resins contain nitrilotriacetic acid (NTA) as the chelating ligand for di- or trivalent metal ions. Its chemical structure allows highly selective binding of recombinant histidine-tagged proteins when charged with Ni²⁺ or other transition metals, such as Zn²⁺ or Cu²⁺. The optimized particle size and high porosity allow operation at increasingly higher flow rates without compromising binding capacity, resulting in superior mass transfer characteristics.

Nuvia IMAC is available in two forms: uncharged and charged with Ni²⁺. The uncharged form can be charged with the metal ion of your choice for even greater purification flexibility. Nuvia IMAC can be used at any scale from laboratory to manufacturing, providing robust, reproducible, and efficient purifications each time. Nuvia IMAC resin delivers value and flexibility by providing users:

- Simple scale-up from laboratory to bioprocess manufacturing scale
- Optimized particle size for high flow rate and low backpressure
- Superior dynamic binding capacity at high flow rates
- Robust base matrix withstands repeated clean-in-place/recharging cycles



Comparison of dynamic binding capacity vs. flow velocity of Nuvia IMAC resin (●), agarose IMAC resin A (■), and agarose IMAC resin B (▲). BT, breakthrough.



Flow performance of Nuvia IMAC resin. 20 x 20 cm column, 1.2 compression factor.

- Excellent recovery and reproducibility
- Full regulatory support

For More Information

Web: bio-rad.com/nuviaIMACresin

Download bulletin: 6859

Ordering Information

Catalog #	Description	Properties (all listed products)
Nuvia IMAC Resins		
7800800	Nuvia IMAC Ni-Charged Resin, 25 ml	<ul style="list-style-type: none"> • Ultra-high capacity at high flow rates • pH stability across broad range • Robust beads
7800801	Nuvia IMAC Ni-Charged Resin, 100 ml	
780-0802	Nuvia IMAC Ni-Charged Resin, 500 ml	
12003233	Nuvia IMAC Ni-Charged Resin, 5 L	
12002782	Nuvia IMAC Ni-Charged Resin, 10 L	
12004040	Nuvia IMAC Uncharged Resin, 5 L	
12004039	Nuvia IMAC Uncharged Resin, 10 L	
Nuvia IMAC Foresight Plates, Columns, and RoboColumn Units		
12004035*	Foresight Nuvia IMAC Ni-Charged Plates, 20 µl	
12004038	Foresight Nuvia IMAC Ni-Charged Column, 1 ml	
12004037	Foresight Nuvia IMAC Ni-Charged Column, 5 ml	
12004051**	Foresight Nuvia IMAC Ni-Charged RoboColumn Unit, 200 µl	
12004052**	Foresight Nuvia IMAC Ni-Charged RoboColumn Unit, 600 µl	

* Package size: 2 x 96-well plates. ** Package size: 1 row of 8 columns.

continues

Ordering Information

Catalog # Description

Bio-Scale Mini Nuvia IMAC Cartridges

7800811 Bio-Scale Mini Nuvia IMAC Cartridge, 5 ml
7800812 Bio-Scale Mini Nuvia IMAC Cartridges, 5 x 5 ml

EconoFit Nuvia IMAC Columns and Application Kits***

12009288 EconoFit Nuvia IMAC Column, 1 x 1 ml, 7 x 25 mm
12009286 EconoFit Nuvia IMAC Column, 1 x 5 ml, 16 x 25 mm
12009285 EconoFit Nuvia IMAC Columns, 5 x 1 ml, 1 ml, 7 x 25 mm
12009287 EconoFit Nuvia IMAC Columns, 5 x 5 ml, 16 x 25 mm
12009289 EconoFit Nuvia IMAC Uncharged Column, 1 x 1 ml, 7 x 25 mm
12009317 EconoFit Desalting Kit, includes 2 x 5 ml each of Bio-Gel P-6 and Nuvia IMAC

*** Maximum pressure 72 psi.

See Also

Affinity media selection guide: page 82.
Bio-Scale Mini cartridges: page 132.
IMAC purification kits: page 108.

Profinity IMAC Resins and Cartridges

Profinity IMAC resins are affinity chromatography supports for the purification of recombinant histidine-tagged proteins. Profinity IMAC resins, based on UNOsphere beads, contain iminodiacetic acid (IDA) as the chelating ligand for di- or trivalent metal ions. Its chemical structure allows highly selective binding of recombinant histidine-tagged proteins when charged with Ni^{2+} or other transition metals such as Zn^{2+} or Cu^{2+} . They offer high capacity at high flow rates and can be used under either non-denaturing or denaturing conditions. The resins are suitable for purification using liquid chromatographic instrumentation, gravity-flow columns, or spin columns. The resin is available in two forms: uncharged and precharged with Ni^{2+} . The uncharged form can be charged with the metal ion of your choice for even greater purification flexibility.

Features of Profinity IMAC resins include:

- Optimal ligand density for higher purity of target protein
- Superb mechanical strength
- Excellent pressure-flow properties for high maximum operating pressures and flow rates, allowing rapid purification, column cleaning, and re-equilibration
- Stability from pH 1–14
- Compatibility with denaturing agents, detergents, and reducing agents

For More Information

Web: bio-rad.com/profinityIMAC



Profinity IMAC Resins



Bio-Scale Mini Profinity IMAC Cartridges

Ordering Information

Catalog #	Description	Properties (all listed products)		
Ready-to-Use Affinity Resins				
1560121	Profinity IMAC Uncharged Resin, 10 ml	<ul style="list-style-type: none"> • Stable from pH 1 to 14 • Strong bead matrix for gravity flow 		
1560123	Profinity IMAC Uncharged Resin, 50 ml			
1560131	Profinity IMAC Ni-Charged Resin, 10 ml			
1560133	Profinity IMAC Ni-Charged Resin, 25 ml			
1560135	Profinity IMAC Ni-Charged Resin, 100 ml			
156-0137	Profinity IMAC Ni-Charged Resin, 500 ml			
Description		5 x 1 ml	1 x 5 ml	5 x 5 ml
Prepacked Bio-Scale Mini Cartridges				
	Profinity IMAC Ni-Charged Resin	7324610	7324612	7324614

Larger volumes and special packaging for industrial applications are available on request.

Profinity Epoxide Resin

Profinity epoxide resin is an activated affinity chromatography support for the immobilization of biomolecules. Profinity epoxide is a useful support for the immobilization of ligands that contain nucleophiles such as amino, thiol, or hydroxyl groups. These groups couple to the epoxy groups on the resin, which is then used for the purification of proteins, carbohydrates, or DNA.

Profinity epoxide resin is based on UNOsphere beads, which have an open pore structure. The open pore structure allows coupling of large ligands for the purification of large targets such as Protein A, recombinant proteins containing MBP, and calmodulin. It is supplied as a dry powder (1 g of powder gives ~8 ml final volume).

For More Information

Web: bio-rad.com/profinityepoxide



Profinity Epoxide Resins

Ordering Information

Catalog #	Description
1560200	Profinity Epoxide Resin, 5 g
1560201	Profinity Epoxide Resin, 25 g

Profinity GST Cartridges and Kits

Profinity GST resin is an affinity chromatography support for the purification of recombinant GST-tagged proteins. Bio-Scale Mini Profinity GST cartridges are 1 and 5 ml Bio-Scale Mini cartridges filled with Profinity GST resin.

For More Information

Web: bio-rad.com/profinityGST

Ordering Information

Catalog #	Description
7324620	Bio-Scale Mini Profinity GST Cartridges, 5 x 1 ml
7324622	Bio-Scale Mini Profinity GST Cartridge, 1 x 5 ml
7324624	Bio-Scale Mini Profinity GST Cartridges, 5 x 5 ml
6200240	GST Buffer Kit , includes GST lysis, wash, and elution buffers
6200243	GST Purification Kit, 1 ml , includes GST purification buffer kit and 2 x 1 ml GST cartridges
6200244	GST Purification Kit, 5 ml , includes 2 GST purification buffer kits and 1 x 5 ml GST cartridge
12009296	EconoFit Profinity GST Column, 1 x 5 ml
12009295	EconoFit Profinity GST Columns, 5 x 1 ml
12009297	EconoFit Profinity GST Columns, 5 x 5 ml

See Also

Bio-Scale Mini cartridges: page 132.

Profinity eXact Resins and Cartridges

Profinity eXact Purification Resin, Prepacked Cartridges, and Mini Spin Columns

The Profinity eXact purification resin consists of a highly engineered subtilisin protease conjugated to an agarose-based matrix. Purity of the eluted protein using this resin is typically higher than that for other affinity-tag systems due to the specific recognition of subtilisin for its prodomain sequence ($K_D < 100$ pM).

The resin can be packed into different column formats, including low- to medium-pressure columns, gravity-flow columns, and mini spin columns, offering added purification flexibility. Bio-Scale Mini cartridges are available in 1 and 5 ml volumes. Mini spin columns contain 0.1 ml resin. Additional advantages of Profinity eXact purification resin include:

- Purification and processing of fusion-tagged proteins in a single step
- On-column cleavage in as little as 30 min
- No protease addition is required
- Precise cleavage at N-terminus to generate native protein sequence

Resin is supplied in 100 mM sodium phosphate (pH 7.2) containing 0.02% sodium azide. It is also available prepacked in 1 and 5 ml cartridges and in mini spin columns.

Profinity eXact Purification Starter Kit

The Profinity eXact expression and purification starter kit can be used to easily evaluate Profinity eXact fusion-tag technology. It is suitable for new purifications requiring tag removal and for purifications where cleavage has resulted in inferior results.

- **Profinity eXact mini spin purification starter kit** — for single-step purification and on-column cleavage of the tagged protein; also includes a lyophilized lysate to ensure that preliminary purifications are a success

Resin Specifications

Functional ligand	Subtilisin protease, 27.8 kD
Base bead	6% agarose bead
Form	50% suspension in 100 mM sodium phosphate (pH 7.2), 0.02% sodium azide
Particle size range	60–160 μ m
Dynamic binding capacity*	>3 mg tag-free protein/ml resin
Recommended linear flow rate	1,000 cm/hr at 25°C
pH stability	2–13
Chemical compatibility	Common reagents, including detergents, reducing agents, buffering agents, and additives
Storage	4°C
Shelf life in 20% ethanol	>1 year at 4°C
Operational temperature	4–40°C

* Dynamic binding capacity determination of a 40 kD maltose binding protein.

Note: Dynamic binding capacity is protein dependent.



Profinity eXact Resin Cartridges and Bottles

Profinity eXact pPAL7 Supercoiled Expression Vector Kit

The pPAL7 supercoiled plasmid expression vector is used for routine cloning of target DNA sequences using a conventional restriction digest cloning strategy.

Profinity eXact Antibody Reagent

The Profinity eXact antibody reagent is a mouse monoclonal antibody used to detect expression of the target protein. The Profinity eXact antibody specifically recognizes the prodomain of the subtilisin protease, which is fused to the protein of interest. For convenient western blot detection of the fusion protein, Bio-Rad offers colorimetric detection kits.

For More Information

Web: bio-rad.com/affinitycartridges

Download bulletin: 5655

Ordering Information

Catalog #	Description
1563007	Profinity eXact Mini Spin Columns , includes 10 spin columns, ten 2 ml capped tubes, and ten 2 ml capless tubes
7324646	Bio-Scale Mini Profinity eXact Cartridges , 2 x 1 ml
7324647	Bio-Scale Mini Profinity eXact Cartridges , 4 x 1 ml
7324648	Bio-Scale Mini Profinity eXact Cartridge , 1 x 5 ml
1563002	Profinity eXact pPAL Supercoiled Expression Vector Kit , includes 100 µl of 100 ng/µl vector, 20 reactions
1563004	Profinity eXact Monoclonal Antibody , 100 µl, 1 mg/ml
1563005	Profinity eXact Purification Resin ,* 10 ml
1563006	Profinity eXact Mini Spin Purification Starter Kit , includes 10 prepacked spin columns, 50 x 2 ml collection tubes, lyophilized control protein lysate, bacterial lysis reagent, 50 ml bind/wash buffer, 20 ml elution buffer
12009292	EconoFit Profinity eXact Column , 1 x 1 ml
12009294	EconoFit Profinity eXact Column , 1 x 5 ml
12009293	EconoFit Profinity eXact Columns , 5 x 1 ml

* Larger volumes are available on request.

Profina System Reagents and Kits**Buffers**

Bio-Rad premade affinity buffer kits for recombinant-tagged protein purification come with concentrated formula sufficient for ten purifications for a 1 ml affinity cartridge. These kits provide easy and fast purification for histidine-tagged (native IMAC buffer) proteins.

- Denaturing IMAC purification can be performed with native buffer IMAC kits with the addition of urea in the purification buffers
- Kits for desalting and cartridge cleaning after affinity purification are also available
- Purification kits containing both buffer kits and appropriate cartridges are provided, if purification cartridges are desired

For More Information

Web: bio-rad.com/profiniareagents

Download bulletins: 3193, 5283, 5444, and 5456

Kits

Buffer and starter kits can be used with any instrument, gravity-flow, or spin-column purification procedure.

Profina purification, buffer, and starter kits are designed specifically for use on the Profina protein purification system for time savings and highly reproducible results. These kits are installed directly on the system; manual dilution of the concentrated buffers provided in the kits is not required.

For More Information

Web: bio-rad.com/profiniareagents

Download bulletin: 5574

Reagents

Individually packaged reagents are available for use with the Profina system. While designed specifically to work with the Profina system, these reagents also have general applicability within all stages of an affinity purification workflow, from sample preparation to protein detection.

Histidine and GST Purification *E. coli* Control Lysate

The histidine and GST purification *E. coli* control lysate is a lyophilized, dual-tagged 51 kD target protein that is meant to eliminate concerns over variability in purification buffer solutions or in the purification matrix itself. The control lysate facilitates system setup and initial purification; it is included in every Profina IMAC and GST starter kit.

Glutathione Reagent

Powdered glutathione reagents are available for use with GST applications. The glutathione pack is essential for eluting GST fusion proteins from immobilized glutathione resins.

Histidine and GST Antibodies

Histidine-tagged and GST-tagged monoclonal antibodies are used to detect target protein expression of overexpressed 6x histidine and GST fusion proteins. They are supplied at a concentration of 1 mg/ml in phosphate buffered saline (pH 7.4) with 0.05% Na₂S₂O₃.



Histidine and GST Purification *E. coli* Control Lysate



Glutathione



Histidine and GST Antibodies



Affinity Purification Kit Selection Guide

Kit	Buffer Sets		Bio-Scale Mini Cartridges*	
	Lysis, Wash, and Elution	Desalting and Cartridge Cleaning	Affinity	Desalting
IMAC Kits				
Native IMAC buffer kit	•			
Native IMAC purification kits (1 and 5 ml)	•		•	
Profinia native IMAC buffer kit	•	•		
Profinia native IMAC purification kits (1 and 5 ml)	•	•	•	•
Profinia native IMAC starter kit	•	•	•	•
GST Kits				
GST buffer kit	•			
GST purification kits (1 and 5 ml)	•		•	
Profinia GST buffer kit	•	•		
Profinia GST purification kits (1 and 5 ml)	•	•	•	•
Profinia GST starter kit	•	•	•	•
Desalting and Cartridge Cleaning Kits				
Desalting and cartridge cleaning buffer kit		•		
Profinia desalting purification kits (10 and 50 ml)		•		•

* Starter kits include histidine and GST control lysate, one 1 ml affinity cartridge, and one 10 ml desalting cartridge.

See Also

Profinia IMAC resins: page 104.

Ordering Information

Catalog #	Description
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Affinity Buffer Kits

6200239	Native IMAC Buffer Kit , includes native IMAC lysis, wash, and elution buffers
6200240	GST Buffer Kit , includes GST lysis, wash, and elution buffers
6200224	Desalting and Cartridge Cleaning Buffer Kit , includes desalting buffer, cleaning buffers, and cartridge storage buffer

Affinity Purification Kits

6200241	Native IMAC Purification Kit , 1 ml, includes IMAC purification buffer kit and 2 x 1 ml IMAC cartridges
6200242	Native IMAC Purification Kit , 5 ml, includes 2 IMAC purification buffer kits and 1 x 5 ml IMAC cartridge
6200243	GST Purification Kit , 1 ml, includes GST purification buffer kit and 2 x 1 ml GST cartridges
6200244	GST Purification Kit , 5 ml, includes 2 GST purification buffer kits and 1 x 5 ml GST cartridge

Profinia Buffer Kits

6200221	Profinia Native IMAC Buffer Kit , includes lysis, wash, and elution buffers, cleaning and storage solutions; sufficient for 10 applications
6200223	Profinia GST Buffer Kit , includes lysis, wash, and elution buffers, cleaning and storage solutions, glutathione reagent; sufficient for 10 applications

Profinia Purification Kits

6200225	Profinia IMAC Purification Kit , 1 ml, includes Profinia native IMAC buffer kit, 2 x 1 ml IMAC and 2 x 10 ml desalting cartridges
6200235	Profinia IMAC Purification Kit , 5 ml, includes 2 Profinia native IMAC buffer kits, 1 x 5 ml IMAC and 1 x 50 ml desalting cartridge
6200226	Profinia GST Purification Kit , 1 ml, includes Profinia GST buffer kit, 2 x 1 ml GST and 2 x 10 ml desalting cartridges
6200236	Profinia GST Purification Kit , 5 ml, includes 2 Profinia GST buffer kits, 1 x 5 ml GST and 1 x 50 ml desalting cartridge
6200228	Profinia Desalting Purification Kit , 10 ml, includes desalting and cartridge cleaning buffer kit, 2 x 10 ml desalting cartridges
6200238	Profinia Desalting Purification Kit , 50 ml, includes 2 desalting and cartridge cleaning buffer kits, 1 x 50 ml desalting cartridge
6200229	Profinia Native IMAC Starter Kit , includes Profinia native IMAC buffer kit, 1 x 1 ml IMAC and 1 x 10 ml desalting cartridge, <i>E. coli</i> lysate
6200230	Profinia GST Starter Kit , includes Profinia GST buffer kit, 1 x 1 ml GST and 1 x 10 ml desalting cartridge, <i>E. coli</i> lysate, glutathione reagent

Bio-Scale Mini Affinity and Desalting Cartridges

7324610	Bio-Scale Mini Profinia IMAC Cartridges , 5 x 1 ml
7324612	Bio-Scale Mini Profinia IMAC Cartridge , 1 x 5 ml
7324614	Bio-Scale Mini Profinia IMAC Cartridges , 5 x 5 ml
7324620	Bio-Scale Mini Profinia GST Cartridges , 5 x 1 ml
7324622	Bio-Scale Mini Profinia GST Cartridge , 1 x 5 ml

continues

Ordering Information

Catalog # Description

Affinity Purification Kit Components

6200205	2x Native IMAC Lysis Buffer, 125 ml
6200206	2x Native IMAC Wash Buffer 1, 125 ml
6200207	2x Native IMAC Wash Buffer 2, 100 ml
6200208	2x Native IMAC Elution Buffer, 100 ml
6200213	2x GST Lysis Buffer, 100 ml
6200215	2x GST Elution Buffer, 100 ml
6200216	5x Desalting Buffer, 200 ml
6200217	2x Cleaning Solution 1, 125 ml
6200218	4x Cleaning Solution 2, 125 ml
6200219	2x Storage Solution, 200 ml

UNOsphere SUPra rProtein A Media

Developed for monoclonal antibody capture chromatography, UNOsphere SUPra resin provides an ideal balance between dynamic binding capacity, flow properties, and stability. The UNOsphere hydrophilic polymeric support provides high-quality purifications and batch-to-batch reproducibility.

Key features include:

- Built on robust polymeric beads engineered for high mechanical stability, low backpressures, and resistance to repeated clean-in-place cycles

- Designed with large pores that result in high dynamic binding capacities at fast flow rates
- Optimized to operate under a wide range of flow rates up to 600 cm/hr

For More Information

Web: bio-rad.com/unospheresupra

Download bulletin: 6053

Request or download bulletins: 5728 and 5729

See Also

Bio-Scale Mini cartridges:
page 132.

EconoFit Columns:
page 127.

Properties of UNOsphere SUPra

Property	Description	Property	Description
Composition	Highly cross-linked polymer	Working pH range	3–11
Particle size range	53–61 μ m	Clean-in-place (CIP) solutions	6 M guanidine hydrochloride 10 mM hydrochloric acid 0.1 M sodium hydroxide 1 M acetic acid/20% ethanol
Ligand	Recombinant Protein A	Recommended mobile phase velocity range	100–600 cm/hr
Coupling chemistry	Epoxy	Temperature stability	2–40°C
Dynamic binding capacity*	30 \pm 3 mg/ml at 150 cm/hour 25 \pm 2 mg/ml at 300 cm/hour 20 \pm 2 mg/ml at 450 cm/hour (Minimum spec: 20 mg/ml at 300 cm/hour)	Delivery conditions	50% slurry in 20% ethanol
Chemical stability**	10 mM hydrochloric acid 6 M guanidine hydrochloride 0.1 M arginine (pH 2.8) 0.1 M citrate (pH 2.8) 0.1 M glycine (pH 2.8)	Storage conditions	2–8°C

* 10% breakthrough capacity determined with 1.0 mg/ml polyclonal human IgG in 1.1 x 10 cm column.

** No significant change in chromatographic performance after storage for 24 hr at room temperature.

Ordering Information

Catalog # Description

UNOsphere SUPra rProtein A Media

1560250	UNOsphere SUPra rProtein A Media, 5 ml
1560218	UNOsphere SUPra rProtein A Media, 25 ml
1560219	UNOsphere SUPra rProtein A Media, 100 ml
12009321	EconoFit UNOsphere SUPra Column, 1 x 1 ml
12009323	EconoFit UNOsphere SUPra Column, 1 x 5 ml
12009322	EconoFit UNOsphere SUPra Columns, 5 x 1 ml

Description	1 x 1 ml	5 x 1 ml	1 x 5 ml
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Prepacked Bio-Scale Mini Cartridges

UNOsphere SUPra Affinity Media	7324200	7324201	7324202
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Affi-Gel and Affi-Prep Protein A Resins

Chromatography on Affi-Gel and Affi-Prep Protein A resins yield highly purified immunoglobulins (IgG), selectively remove IgG prior to analysis of other IgG classes, or adsorb immune complexes for antigen purification. Protein A binds to the Fc region of immunoglobulins, especially IgG from mammalian species. Advantages include:

- High purity of IgGs
- High affinity for mammalian IgG
- High capacities for mouse IgG₁ as well as other subclasses with MAPS optimized buffer

In addition, Affi-Prep resins offer high linear flow rates up to 2,000 cm/hr, pressure stability up to 1,000 psi (70 bar), and high chemical stability, which allows sanitization with 0.1 M NaOH.

With Affi-Gel and Affi-Prep Protein A resins and MAPS II buffer, you can purify up to 10 mg of IgG₁/ml of media.

This is 8–10 times higher than with standard methods. In addition, the MAPS process and Affi-Gel Protein A permit greater binding of mouse IgG₁ than does immobilized Protein G resin.

For More Information

Web: bio-rad.com/affigelproteina

Capacities of Protein A Resins

Immunoglobulin	Affi-Gel Protein A Capacity, mg/ml	Affi-Prep Protein A Capacity, mg/ml
Mouse IgG ₁	6–10	7–9
Mouse IgG _{2a}	6–10	7–9
Mouse IgG _{2b}	6–10	7–9
Mouse IgG ₃	6–10	7–9
Mouse IgM*	6–10	7–9
Human IgG	15	10–12
Sheep, cow, horse, goat, rabbit, dog, pig IgG	8–10	7–9

* Approximately 50% of all mouse IgMs bind using the MAPS buffer system.

Ordering Information

Catalog # Description

Affi-Prep and Affi-Gel Media

1560006	Affi-Prep Protein A Media, 5 ml
1560005	Affi-Prep Protein A Media, 25 ml
1536153	Affi-Gel Protein A Media, 5 ml
1536154	Affi-Gel Protein A Media, 50 ml
1536159	Affi-Gel Protein A MAPS II Kit, includes 5 ml Affi-Gel Protein A media, Affi-Gel Protein A MAPS II buffers, 1 x 10 cm Econo-Column column; enough to purify 500 mg of mouse IgG ₁
1536161	Protein A MAPS II Binding Buffer, makes 5 L

Prepacked Econo-Pac Columns

7322022	Econo-Pac Protein A Columns, prefilled with Affi-Gel Protein A media, 5
7322020	Econo-Pac Protein A Kit, 1 x 2 ml Affi-Gel Protein A column, 1 x 10 ml 10DG column, buffers

Description	5 x 1 ml	1 x 5 ml
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Prepacked Bio-Scale Mini Cartridges

Affi-Prep Protein A Media	7324600	7324602
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Catalog # Description

12009237	EconoFit Affi-Prep Protein A Column, 1 x 5 ml
12009236	EconoFit Affi-Prep Protein A Columns, 5 x 1 ml

Affi-Gel Blue Resin

Affi-Gel Blue resin is a cross-linked agarose bead with covalently attached Cibacron Blue F3GA dye. The blue dye functions as an ionic, hydrophobic, aromatic, or sterically active binding site in various applications. Affi-Gel Blue resin is ideally suited for albumin removal (using 50–100 mesh) and enzyme purification (using 100–200 mesh). Proteins and peptides are bound and released with a high degree of specificity by manipulating the composition of the eluent buffers.

The resin is available in bottle and cartridge form.

For More Information
Web: bio-rad.com/affigelblue



Bio-Scale Mini Affi-Gel Blue Cartridge



Affi-Gel Blue Gel

Ordering Information

Catalog #	Description	Applications (all listed products)
1537301	Affi-Gel Blue Gel , 100 ml, 50–100 mesh	<ul style="list-style-type: none"> • Albumin removal • Enzyme purification
1537302	Affi-Gel Blue Gel , 100 ml, 100–200 mesh	
153-7303	Affi-Gel Blue Gel , 1 L, 100–200 mesh	
7324642	Bio-Scale Mini Affi-Gel Blue Cartridge , 1 x 5 ml, cartridge packed with 100–200 mesh media	
7324644	Bio-Scale Mini Affi-Gel Blue Cartridges , 5 x 5 ml, cartridges packed with 100–200 mesh media	
12009234	EconoFit Affi-Gel Blue Column , 1 x 5 ml	
12009235	EconoFit Affi-Gel Blue Columns , 5 x 5 ml	

DEAE Affi-Gel Blue Resin

DEAE Affi-Gel Blue resin is a bifunctional affinity gel containing Cibacron Blue F3GA dye covalently attached to DEAE Bio-Gel A resin. The dye binds albumin, proteases, and other complement proteins; the DEAE group binds remaining acidic proteins. Features of DEAE Affi-Gel Blue resin include:

- Single-step IgG purification from serum; the eluted IgG contains a small amount of transferrin (samples are diluted approximately fivefold)
- No detectable proteolytic activity in the eluted IgG fraction
- Economical alternative to Protein A affinity chromatography
- Available in bottle and cartridge form

For More Information
Web: bio-rad.com/affigelDEAE



Bio-Scale Mini DEAE Affi-Gel Blue Cartridge



DEAE Affi-Gel Blue Gel

Ordering Information

Catalog #	Description	Applications (all listed products)	
1537307	DEAE Affi-Gel Blue Gel, 100 ml	<ul style="list-style-type: none"> • Albumin, proteases, and complement protein removal • IgG purification 	
153-7306	DEAE Affi-Gel Blue Gel, 1 L		
153-7308	DEAE Affi-Gel Blue Gel, 5 L		
7324632	Bio-Scale Mini DEAE Affi-Gel Blue Cartridge, 1 x 5 ml		
7324634	Bio-Scale Mini DEAE Affi-Gel Blue Cartridge, 5 x 5 ml		
Description		1 x 5 ml	5 x 5 ml
Prepacked Bio-Scale Mini Cartridges			
DEAE Affi-Gel Blue Gel		7324632	7324634
Affi-Gel Blue Gel		7324642	7324644

CM Affi-Gel Blue Resin

CM Affi-Gel Blue resin contains Cibacron Blue F3GA dye covalently coupled to CM Bio-Gel A resin. This bifunctional gel binds both albumin and serum proteases. CM Affi-Gel Blue chromatography provides a convenient initial step in the purification of serum proteins. Features of CM Affi-Gel Blue resin include:

- Rapid removal of $\geq 90\%$ of albumin and all plasminogen in serum samples
- No prior sample preparation needed
- $\geq 80\%$ yield of stable antiserum free of albumin and protease activity

For More Information

Web: bio-rad.com/affigelcm



CM Affi-Gel Blue Gel

Ordering Information

Catalog #	Description
1537304	CM Affi-Gel Blue Gel, 100 ml
153-7305	CM Affi-Gel Blue Gel, 1 L

Affi-Gel Boronate Resin

Affi-Gel boronate-derivatized polyacrylamide resin has affinity for coplanar adjacent *cis*-hydroxyl groups (*cis*-diols) and a high binding capacity, which provides highly efficient separation of low MW molecules such as nucleotides, nucleosides, catecholamines, and sugars. It has a sorbitol capacity of 130 $\mu\text{mol/ml}$.

For More Information

Web: bio-rad.com/affigelboronate

Download bulletin: 1066



Affi-Gel Boronate Gel

Ordering Information

Catalog #	Description
1536103	Affi-Gel Boronate Gel, 5 g
153-6104	Affi-Gel Boronate Gel, 50 g

Affi-Prep Polymyxin Resin

Affi-Prep polymyxin resin consists of 2–4 mg of USP-grade polymyxin per ml of the macroporous polymeric Affi-Prep support. Affi-Prep polymyxin resin binds endotoxins from a number of different strains of gram-negative bacteria including *E. coli*, *Salmonella abortus*, *S. minnesota*, and *Serratia marcescens*. Features of Affi-Prep polymyxin resin include:

- Endotoxin removal in research and process-scale applications
- Linear flow rates to 2,000 cm/hr
- Pressure stability to 1,000 psi (70 bar)
- High chemical stability (withstands sanitization with 0.1 M NaOH)

For More Information

Web: bio-rad.com/affigelpolymyxin



Affi-Prep Polymyxin Resin

Ordering Information

Catalog #	Description
1560010	Affi-Prep Polymyxin Resin, 25 ml

Affi-Gel Heparin Resin

Affi-Gel heparin resin is a ready-to-use support for the purification of a range of proteins such as coagulation factors, other plasma proteins, polynucleotide polymerases, nucleases, lipases, lipoproteins, and proteases. Heparin binds a variety of enzymes and other proteins, either ionically or by other specific enzyme-inhibitor (or enzyme-activator) interactions. Features of Affi-Gel heparin resin include:

- Heparin content ≥ 0.6 mg/ml
- Human antithrombin III binding capacity ≥ 1.2 mg/ml
- Linear flow rates of 10–20 cm/hr

For More Information

Web: bio-rad.com/affigelheparin



Affi-Gel Heparin Gel

Ordering Information

Catalog #	Description
1536173	Affi-Gel Heparin Gel , 40 ml

Affi-Gel 10 and Affi-Gel 15 Resins

Affi-Gel 10 and Affi-Gel 15 activated affinity resins provide spontaneous, rapid, and highly efficient coupling of ligands via primary amines. Affi-Gel 10 resin is most efficient for coupling neutral or basic proteins with pI 6.5–11. Affi-Gel 15 resin is recommended for coupling acidic proteins with pI <6.5. Affi-Gel 10 and 15 resins offer:

- Aqueous or anhydrous coupling conditions
- Complete protein coupling within 4 hr at 4°C
- Protein coupling capacity up to 35 mg/ml of resin

For More Information

Web: bio-rad.com/affigel10and15

Download bulletin: 1085

Ordering Information

Catalog #	Description
1536099	Affi-Gel 10 Media , 25 ml
1536046	Affi-Gel 10 Media , 4 x 25 ml
153-1000	Affi-Gel 10 Media , 1 L
1536051	Affi-Gel 15 Media , 25 ml
1536052	Affi-Gel 15 Media , 4 x 25 ml
1536098	Affi-Gel 10/15 Combination , includes 2 x 25 ml Affi-Gel 10 media and 2 x 25 ml Affi-Gel 15 media

Affi-Gel Hz Hydrazide Resin

Affi-Gel Hz hydrazide activated resin couples immunoglobulin G (IgG) molecules via carbohydrate moieties on the Fc region of antibody molecules. Fc attachment results in a more specific antigen-antibody interaction and 100–300% higher antigen binding capacity than other resins. Affi-Gel Hz resin advantages include:

- Stable covalent hydrazone bonds
- Mild oxidation without alteration of antibody activity
- High antigen binding capacity
- pH stability

For More Information

Web: bio-rad.com/affigelhydrazide

Ordering Information

Catalog #	Description
1536047	Affi-Gel Hz Hydrazide Media , 25 ml
1536060	Affi-Gel Hz Immunoaffinity Kit , includes 5 ml Affi-Gel Hz media, 2 x 25 mg Affi-Gel Hz oxidizer, 25 ml Affi-Gel Hz coupling buffer concentrate, 2 Econo-Pac 10DG desalting columns, 1 x 10 cm Econo-Column column
153-6054	Affi-Gel Hz 10x Coupling Buffer Concentrate , 500 ml

Carbodiimide Activated Resin

Affi-Gel 102 resin is for use with 1-ethyl-3-(3-dimethylaminopropyl)carbodiimide hydrochloride (EDAC or EDC) carbodiimide coupling reagent, which immobilizes ligands that contain primary or terminal carboxyl groups. The resin offers flexible alternative chemistries and economy.

Affi-Gel 102 amino-terminal cross-linked agarose resins with a six-atom hydrophilic arm feature:

- EDAC carbodiimide coupling reagent
- Compatibility with carboxyl-containing ligands

For More Information

Web: bio-rad.com/carbodiimide

See Also

Affinity media selection guide: page 82.

Ordering Information

Catalog #	Description
1532401	Affi-Gel 102 Media , 50 ml
1530990	EDAC , 5 g

Size Exclusion Chromatography

See Also

Sample preparation products: page 1.

Gel filtration chromatography standard: page 122.

Bio-Spin and Micro Bio-Spin prepacked columns: page 134.

Empty Econo-Pac columns: page 141.

ENrich SEC columns: page 126.

Bio-Gel P Media

Bio-Gel P polyacrylamide resin, for high-resolution gel filtration, is prepared by copolymerization of acrylamide and N,N'-methylene-*bis*-acrylamide. Bio-Gel P resin:

- Is available in several particle size ranges with molecular weight exclusion limits ranging from 100–100,000
- Is extremely hydrophilic and essentially nonionic
- Provides efficient, gentle gel filtration of sensitive compounds
- Does not support microbial growth or leach carbohydrates (due to its synthetic composition) as dextrose and agarose gels can

Bio-Gel P resin is autoclavable at pH 5.5–6.5 and operates over a pH range of 2–10 at room temperature. Flow rate and resolution increase with increasing temperature in the range of 4–80°C.

Bio-Gel P polyacrylamide resin is available as bottled resin or as prepacked spin columns and cartridges. Cartridges are packed with Bio-Gel P-6 resin, while spin columns come prepacked with both P-6 and P-30 resin in either Tris or SSC buffer.

For More Information

Web: bio-rad.com/biogelp

Download bulletin: 2068



Bio-Gel P Resin



Bio-Scale Mini Bio-Gel Cartridges

Bio-Gel P Polyacrylamide Resin Selection Guide

Media	MW Fractionation Range
Bio-Gel P-2	100–1,800
Bio-Gel P-4	800–4,000
Bio-Gel P-6	1,000–6,000
Bio-Gel P-6DG	1,000–6,000
Bio-Gel P-10	1,500–20,000
Bio-Gel P-30	2,500–40,000
Bio-Gel P-60	3,000–60,000
Bio-Gel P-100	5,000–100,000

Ordering Information

Catalog #	Description	Comments
1504114	Bio-Gel P-2 Media , fine, 100 g	Rapid carbohydrate, peptide, and protein desalting
150-4115	Bio-Gel P-2 Media , fine, 500 g	
12002617	Bio-Gel P-2 Media , fine, 1 kg	
1504118	Bio-Gel P-2 Media , extra fine, 100 g	Carbohydrate and peptide separations, protein desalting
1504120	Bio-Gel P-4 Media , medium, 100 g	
1504124	Bio-Gel P-4 Media , fine, 100 g	
1504128	Bio-Gel P-4 Media , extra fine, 100 g	Purification of proteins and polypeptides
1504130	Bio-Gel P-6 Media , medium, 100 g	
1504134	Bio-Gel P-6 Media , fine, 100 g	
1504138	Bio-Gel P-6 Media , extra fine, 100 g	Rapid carbohydrate, peptide, and protein desalting; also available in prepacked columns and cartridges
1500738	Bio-Gel P-6DG Media , 100 g	
150-0739	Bio-Gel P-6DG Media , 1 kg	
1504140	Bio-Gel P-10 Media , medium, 100 g	Purification of proteins and polypeptides
1504144	Bio-Gel P-10 Media , fine, 100 g	
1504150	Bio-Gel P-30 Media , medium, 100 g	
1504154	Bio-Gel P-30 Media , fine, 100 g	Purification of proteins and polypeptides
12002610	Bio-Gel P-30 Media , fine, 1 kg	
1504160	Bio-Gel P-60 Media , medium, 100 g	
1504164	Bio-Gel P-60 Media , fine, 100 g	Purification of proteins and polypeptides
12002609	Bio-Gel P-60 Media , fine, 1 kg	
1504170	Bio-Gel P-100 Media , medium, 100 g	
1504174	Bio-Gel P-100 Media , fine, 100 g	

continues

Ordering Information

Catalog #	Description
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Prepacked Econo-Pac Columns

7322010	Econo-Pac 10DG Desalting Columns, 30
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EconoFit Bio-Gel P-6 Desalting Columns

12009238	EconoFit Bio-Gel P-6 Desalting Column , 1 x 5 ml, column filled with Bio-Gel P-6 gel filtration (size exclusion) chromatography support; 16 x 25 mm, maximum pressure 72 psi. For desalting or buffer exchange
12009239	EconoFit Bio-Gel P-6 Desalting Columns , 5 x 5 ml, columns filled with Bio-Gel P-6 gel filtration (size exclusion) chromatography support; 16 x 25 mm, maximum pressure 72 psi. For desalting or buffer exchange
12009317	EconoFit Desalting Kit , includes 2 x 5 ml each of Bio-Gel P6 and Nuvia IMAC

Description	Pack of 1	Pack of 5
Prepacked Bio-Scale Mini Cartridges		
Bio-Gel P-6 Gel (Desalting) , 5 ml	7324502	7324504
Bio-Gel P-6 Gel , 10 ml	—	7325304
Bio-Gel P-6 Gel , 50 ml	7325312	7325314

Catalog #	Description
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Adaptor Fittings

7320111	Luer to M6 Adaptor Fittings Kit , includes luer to M6 fittings to connect 1 cartridge to an FPLC system
7320112	Luer to 10-32 Adaptor Fittings Kit , includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system
7320113	Luer to BioLogic and NGC Systems Fittings Kit , low-pressure system fittings kit, includes 1/4–28 female to male and 1/4–28 female to female luers to connect 1 cartridge to BioLogic DuoFlow and NGC systems

Catalog #	Description	Contents	MW	pI	For Use with
Standard					
1511901	Gel Filtration Standard , 6 vials	Thyroglobulin	670,000	4.5	ENrich.SEC
		Bovine γ -globulin	158,000	5.1	columns;
		Chicken ovalbumin	44,000	4.6	Bio-Gel P media
		Equine myoglobin	17,000	6.9	
		Vitamin B ₁₂	1,350	4.5	

Bio-Gel A 1.5 m Media

Bio-Gel A 1.5 m resin, ideal for purification of antibodies and aggregates, consists of agarose beads in which the pore size is controlled by the percentage of agarose in the gel. It is compatible with all commonly used buffers and can be used with high-salt buffers without significantly

changing the bed volume. Bio-Gel A 1.5 m resin may be used at pH 4–13 and at temperatures 2–30°C. The fractionation range is 10,000–1,500,000 daltons.

For More Information
Web: bio-rad.com/biogela

Ordering Information

Catalog #	Description
151-0450	Bio-Gel A 1.5 m Gel , fine, 500 ml

See Also

ENrich SEC columns: page 126.

Bio-Beads S-X Resins

Bio-Beads S-X resins are neutral porous styrene divinylbenzene beads for size exclusion chromatography of lipophilic polymers and other solutes that require organic eluents. MW exclusion limits range from 400–14,000. This range is useful for fractionation of low MW organic polymers and other hydrophobic substances. Exclusion limits are influenced by the eluent used. Bio-Beads S-X resins require an eluent that is mobile; therefore, the beads must be used in a column. The beads are compatible with benzene, toluene, xylene, carbon tetrachloride, dimethylformamide, ketones, aromatics,

methylene chloride, *o*-dichlorobenzene, perchloroethylene, tetrahydrofuran, and trichlorobenzene.

Recommended flow rates depend upon the cross-linkage:

- 1% cross-linked resins are used only with gravity flow
- 3% cross-linked resins can withstand a flow of 5 ml/min with a backpressure of 20 bar or 300 psi
- 8% and 12% cross-linked resins can withstand backpressure up to 33 bar or 500 psi

For More Information

Web: bio-rad.com/biobeads

Ordering Information

Catalog #	Description	Size, μm	ml/dry g*	Application**
1522150	Bio-Beads S-X1 Media , 100 g	40–80	7.5	1% cross-linked; for lipophilic polymers of MW 600–14,000
152-2151	Bio-Beads S-X1 Media , 1 kg	40–80	7.5	1% cross-linked; for lipophilic polymers of MW 600–14,000
1522750	Bio-Beads S-X3 Media , 100 g	40–80	4.75	3% cross-linked; for organic compounds of MW \leq 2,000
1523350	Bio-Beads S-X8 Media , 100 g	40–80	3.1	8% cross-linked; for organic compounds of MW \leq 1,000
1523650	Bio-Beads S-X12 Media , 100 g	40–80	2.5	12% cross-linked; for organic compounds of MW \leq 400

Larger volumes and special packaging for industrial applications are available on request.

* Swollen in benzene.

** MW range is for beads fully swollen in benzene.

Hydrophobic Interaction Chromatography

Macro-Prep HIC Resins

Macro-Prep HIC resins are methacrylate-based beads for protein, polypeptide, enzyme, and nucleic acid purification. They are autoclavable and can withstand treatment in acid, base (pH up to 10), chaotropic agents, or detergents while retaining high protein binding capacities. They are available in two functional forms: a weakly hydrophobic methyl support for purification of compounds with strong hydrophobic regions, and a mildly hydrophobic *t*-butyl support for purification of compounds with few or weakly hydrophobic regions. Both resins are chemically and thermally stable. They can be cleaned in place with ethanol or 1% acetic acid and 1% phosphoric acid.

For More Information

Web: bio-rad.com/macroprepHIC

Download bulletin: 1841



Macro-Prep Methyl HIC Support

Ordering Information

Description	Methyl HIC	t-Butyl HIC
Macro-Prep HIC Support, 25 ml	1580080	1580090
Macro-Prep HIC Support, 100 ml	1560080	1560090
Macro-Prep HIC Support, 500 ml	156-0081	156-0091
Macro-Prep HIC Support, 5 L	156-0082	—
Macro-Prep HIC Support, 10 L	156-0083	156-0093

Catalog #	Description
EconoFit Macro-Prep Columns*	
12009277	EconoFit Macro-Prep Methyl HIC Column, 1 x 1 ml, 7 mm x 25 mm
12009278	EconoFit Macro-Prep t-Butyl HIC Column, 1 x 1 ml, 7 mm x 25 mm

* Maximum pressure 72 psi.

Bio-Beads SM-2 Adsorbents

Bio-Beads SM-2 nonpolar polystyrene adsorbents are analytical-grade neutral macroporous polymeric beads with a high surface area for adsorbing organics of MW <2,000. These beads can be used in aqueous solution and with solvents or solvent mixtures, including alcohols, petroleum ether, diethyl ether, and hexane, without expansion or contraction of the beads.

Common applications of Bio-Beads SM-2 adsorbents include the removal of detergents such as Triton X-100, the removal of organics such as polyaromatic hydrocarbons from water, cleanup of drugs from plasma and urine, cleanup of biological metabolites and pesticides, and cleanup of dyes and mycotoxins from food products.



Bio-Beads SM-2 Adsorbent

For More Information

Web: bio-rad.com/biobeads_SM2

Download bulletin: 1461

Request or download bulletin: 6905

Ordering Information

Catalog #	Description
1528920	Bio-Beads SM-2 Adsorbents, 25 g
1523920	Bio-Beads SM-2 Adsorbents, 100 g
152-3922	Bio-Beads SM-2 Adsorbents, 1 kg
152-3923	Bio-Beads SM-2 Adsorbents, 10 kg

Chromatography Sample Packs, Kits, and Standards

Sample Packs

Bio-Rad offers its most popular resins in a variety of convenient sampler packs:

- **Resin sampler pack** — includes 25 ml each of UNOsphere Q and S, Nuvia S, Macro-Prep DEAE, High Q, and High S; 5 ml of UNOsphere SUPrA; 10 g each of CHT ceramic hydroxyapatite Types I and II, 40 µm; and 10 g of CFT ceramic fluoroapatite Type II resins
- **Bio-Scale Mini ion exchange sampler pack** — includes one 1 ml cartridge each of UNOsphere Q and S, Macro-Prep High Q and High S, and DEAE resins
- **Bio-Scale Mini affinity sampler pack** — includes one 1 ml cartridge each of Profinity IMAC, Affi-Prep Protein A, and Profinity GST resins and one 5 ml cartridge each of DEAE Affi-Gel Blue and Affi-Gel Blue resins



Resin Sampler Packs



Bio-Scale Mini Cartridges

For More Information

Web: bio-rad.com/resinsampling

Ordering Information

Catalog #	Description
Process Scale Media	
1580100	Resin Sampler Pack , includes 25 ml each of Macro-Prep DEAE, Macro-Prep High Q, Macro-Prep High S, UNOsphere Q, UNOsphere S, 5 ml of UNOsphere SuPrA, 10 g each of CHT ceramic hydroxyapatite Types I and II, 40 µm, and 10 g of CFT ceramic fluoroapatite Type II, 40 µm
Bio-Scale Mini Kits	
7324650	Bio-Scale Mini Ion Exchange Sampler Pack , includes one 1 ml cartridge each of UNOsphere S, UNOsphere Q, Macro-Prep High Q, Macro-Prep High S, Macro-Prep DEAE
7324651	Bio-Scale Mini Affinity Sampler Pack , includes one 1 ml cartridge each of Profinity IMAC, Affi-Prep Protein A, and Profinity GST, one 5 ml cartridge each of DEAE Affi-Gel Blue and Affi-Gel Blue

Chromatography Application Kits

Maximize method optimization and parameter screening for biomolecules with these convenient, ready-to-use application and resin screening kits. These kits address the entire range of needs for biomolecule purification from capture, intermediate contaminant removal, and final polishing.

- Convenient prepacked columns
- Ideal for screening and optimization of purification protocols
- Reproducible and scalable results

For More Information

Web: bio-rad.com/resinsampling
 Request or download bulletin: 5728



See Also

- Ion exchange resins: page 84.
- Macro-Prep ion exchange media: page 87.
- UNOsphere and Nuvia ion exchange media: page 84.
- CHT ceramic hydroxyapatite: page 97.
- CFT ceramic fluoroapatite: page 99.
- Macro-Prep HIC resins: page 118.
- Bio-Scale Mini cartridges: page 132.

Ordering Information

Catalog #	Description
7324407	Bio-Scale Mini Apatite Purification Cartridge Kit , includes one each, 5 ml prepacked CFT ceramic fluoroapatite Type II, 40 µm and CHT ceramic hydroxyapatite Type I and II, 40 µm, multimodal chromatography media cartridges
7324408	Bio-Scale Mini mAb Purification Cartridge Kit , includes one each, 5 ml prepacked UNOsphere SUPRA affinity media, UNOsphere Q media, and CHT ceramic hydroxyapatite Type I, 40 µm, cartridges

EconoFit Application Kits

12009315	EconoFit Aggregate Clearance Kit , includes one 1 ml each of Nuvia cPrime, Nuvia aPrime 4A, Nuvia HR-S, CHT XT
12009311	EconoFit Anionic IEX Kit , includes 1 ml each of Macro-Prep High Q, Macro-Prep High Q-3HT, UNOsphere Q, Nuvia Q, Macro-Prep DEAE, and Nuvia HP-Q
12009310	EconoFit Cationic IEX Kit , includes 1 ml each of Macro-Prep High S, UNOsphere S, Nuvia S, Nuvia HR-S, and Macro-Prep CM
12009309	EconoFit CHT Kit , includes 1 ml each of CHT I, 40 µm; CHT II, 40 µm; MPC I, 40 µm; and CFT II, 40 µm
12009317	EconoFit Desalting Kit , includes 2 x 5 ml each of Bio-Gel P6 and Nuvia IMAC
12009314	EconoFit Large Biomolecule Kit , includes 1 ml each of Nuvia Q; Nuvia HP-Q; Nuvia cPrime; Nuvia aPrime 4A; CHT II, 40 µm; and CHT XT
12009313	EconoFit mAb Kit , includes 1 ml each of Nuvia S, Nuvia Q, Nuvia cPrime, Nuvia aPrime 4A, Nuvia HR-S, and CHT XT

Chromatography Standards

Ion Exchange Chromatography Standards

Bio-Rad offers two protein standards for ion exchange chromatography that are suitable for use with bulk resins, cartridges, or columns. Each standard is supplied as a set of six vials of lyophilized protein mixture for qualitative analysis only.

Organic Acid Standard

Bio-Rad's organic acid standard is supplied as a set of six vials of lyophilized mixture for qualitative analysis only.

Carbohydrate Analysis Standard

Bio-Rad's carbohydrate standard is supplied as a set of six vials of lyophilized mixture for qualitative analysis only. The standards can be used for column testing or semiquantitative determination.

Gel Filtration Chromatography Standard

Bio-Rad's gel filtration standard is a calibration standard for size exclusion columns used in protein purification. The mixture includes vitamin B₁₂ and myoglobin, which are visible when eluting from glass or clear plastic columns, to ensure that the column is properly packed and the sample is eluting evenly. The standard can be used with most size exclusion HPLC columns. The standard is supplied as a set of six vials of lyophilized protein mixture.

For More Information

Web: bio-rad.com/chromstandards

Standard Specifications

Description	Contents	MW	pI	For Use with
Protein Standard for Anion Exchange Chromatography	Equine myoglobin	17,000	6.9	UNO Q columns; Bio-Scale Mini
	Conalbumin	77,000	4.9	UNOsphere Q cartridges;
	Chicken ovalbumin	45,000	4.6	Macro-Prep High Q and DEAE resins;
	Soybean trypsin inhibitor	21,500	4.5	UNOsphere Q resin
Protein Standard for Cation Exchange Chromatography	Equine myoglobin	17,000	6.9	UNO S columns; Bio-Scale Mini
	Ribonuclease A	13,500	8.7	UNOsphere S cartridges;
	Cytochrome c	12,000	10.7	Macro-Prep High S and CM resins; UNOsphere S resin
Organic Acid Analysis Standard	Sodium oxalate	134		Aminex HPX-87H column; organic acid analysis kit
	Sodium citrate	294		
	Sodium malate	196		
	Sodium succinate	270		
	Sodium formate	69		
	Sodium acetate	82		
Carbohydrate Analysis Standard	Melezitose	504		Aminex HPX-87C column; carbohydrate analysis kit
	Maltose	360		
	Glucose	180		
	Mannose	180		
	Fructose	180		
	Adonitol (ribitol)	152		
Gel Filtration Standard	Thyroglobulin	670,000	4.5	SEC columns; Bio-Gel P resin; ENrich SEC columns
	Bovine γ -globulin	158,000	5.1	
	Chicken ovalbumin	44,000	4.6	
	Equine myoglobin	17,000	6.9	
	Vitamin B ₁₂	1,350	4.5	

Ordering Information

Catalog #	Description	Contents	MW	pI	For Use with
1250561	Protein Standard for Anion Exchange Chromatography , 6 vials	Equine myoglobin	17,000	6.9	ENrich Q Columns; UNO Q columns; Bio-Scale Mini UNOsphere Q cartridges; Macro-Prep High Q and DEAE media; UNOsphere Q media
		Conalbumin	77,000	4.9	
		Chicken ovalbumin	45,000	4.6	
		Soybean trypsin inhibitor	21,500	4.5	
1250562	Protein Standard for Cation Exchange Chromatography , 6 vials	Equine myoglobin	17,000	6.9	ENrich S Columns; UNO S columns; Bio-Scale Mini UNOsphere S cartridges; Macro-Prep High S and CM media; UNOsphere S media
		Ribonuclease A	13,500	8.7	
		Cytochrome c	12,000	10.7	
1250586	Organic Acid Analysis Standard , 6 vials	Sodium oxalate	134		Aminex HPX-87H column; organic acid analysis kit
		Sodium citrate	294		
		Sodium malate	196		
		Sodium succinate	270		
		Sodium formate	69		
		Sodium acetate	82		
1250585	Carbohydrate Analysis Standard , 6 vials	Melezitose	504		Aminex HPX-87H column; carbohydrate analysis kit
		Maltose	360		
		Glucose	180		
		Mannose	180		
		Fructose	180		
		Adonitol (ribitol)	152		
1511901	Gel Filtration Standard , 6 vials	Thyroglobulin	670,000	4.5	ENrich SEC columns; Bio-Gel P media
		Bovine γ -globulin	158,000	5.1	
		Chicken ovalbumin	44,000	4.6	
		Equine myoglobin	17,000	6.9	
		Vitamin B ₁₂	1,350	4.5	

Chromatography Columns

A complete range of prepacked and empty columns and accessories is available for protein and peptide separations. Bio-Rad's many disposable spin and gravity chromatography columns are made of chemically compatible polypropylene, are autoclavable, and can be washed with NaOH. Our low-pressure glass Econo-Column chromatography columns offer an ideal combination of performance, reliability, and value. For high-resolution separations, Bio-Rad's Bio-Scale MT medium-pressure columns can be run on a variety of liquid chromatography systems and are provided prepacked with selected resins.

 [Learn More about the Technology](#)
 Web: bio-rad.com/tech/chrom

Prepacked Chromatography Columns

Prepacked Column Selection Guide by Application

Application	Media	Type of Separation	Chemical Form	Binding Capacity/ml
Antibody/mAb Purification	UNOsphere SUPrA	Affinity	rProtein A	Human IgG: 30 mg/ml*
	Affi-Prep Protein A	Affinity	Protein A	Mouse monoclonal IgG: 8–10 mg; human IgG: 16–23 mg
	UNOsphere Q	Strong anion exchange	$-N(CH_3)_3^+$	BSA: 180 mg/ml*
	Nuvia Q	Strong anion exchange	$-N(CH_3)_3^+$	IgG: >170 mg/ml at 300 cm/hr
	Nuvia cPrime	Hydrophobic cation exchange	$-N(CH_3)_3^+$	Lactoferrin: >60 mg/ml; IgG: 40 mg/ml
	Nuvia S	Strong cation exchange	$-SO_3^-$	IgG: 110 mg/ml
	Nuvia HR-S	High-resolution strong cation exchange	$-SO_3^-$	IgG: ≥70 mg/ml
	CHT Type I, 40 μm	Hydroxyapatite	$Ca_5(PO_4)_3(OH)_2$	Human IgG: 25–60 mg
	CHT Type II, 40 μm	Hydroxyapatite	$Ca_5(PO_4)_3(OH)_2$	Human IgG: 15–25 mg
	MPC	Hydroxyfluoroapatite	$Ca_{10}(PO_4)_6(OH)_{1.5}(F)_{0.5}$	Human IgG: 25–50 mg/ml
CFT	Fluoroapatite	$Ca_{10}(PO_4)_6F_2$	Lysozyme: 14–21.5 mg/g	
DEAE Affi-Gel Blue	Affinity	Cibacron Blue F3GA and DEAE	Serum: 0.2–1.0 ml	
Affinity Protein Purification	Nuvia IMAC	Affinity	Nitrilotriacetic acid (NTA)	Recombinant histidine-tagged protein: ≥40 mg
	Profinity IMAC	Affinity	Iminodiacetic acid	Recombinant histidine-tagged protein: ≥15 mg
	Profinity GST	Affinity	Glutathione	Recombinant GST-tagged protein: ≥10 mg/ml
	Profinity eXact	Affinity	Modified subtilisin	Tag-free maltose-binding protein/ml resin: >3 mg/ml
	UNOsphere SUPrA	Affinity	rProtein A	Human IgG: 30 mg/ml*
Protein Purification	Nuvia Q	Strong anion exchange	$-N(CH_3)_3^+$	IgG: >170 mg/ml at 300 cm/hr
	Nuvia HP-Q	High-throughput strong anion exchange	$-N(CH_3)_3^+$	Thyroglobulin: ≥28 mg/ml at 150 cm/hr
	Nuvia cPrime	Hydrophobic cation exchange	$-N(CH_3)_3^+$	Lactoferrin: >60 mg/ml; IgG: 40 mg/ml
	Nuvia S	Strong cation exchange	$-SO_3^-$	IgG: 110 mg/ml
	Nuvia HR-S	High-resolution strong cation exchange	$-SO_3^-$	IgG: ≥70 mg/ml
	Macro-Prep High S	Strong cation exchange	$-SO_3^-$	Human IgG: ≥49 mg
	CHT	Hydroxyapatite	$Ca_5(PO_4)_3(OH)_2$	Human IgG: 25–60 mg/ml*
	MPC	Hydroxyfluoroapatite	$Ca_{10}(PO_4)_6(OH)_{1.5}(F)_{0.5}$	Human IgG: 25–50 mg/ml
CFT	Fluoroapatite	$Ca_{10}(PO_4)_6F_2$	Lysozyme: 14–21.5 mg/g	
High-Resolution Polishing	ENrich Q	Strong anion exchange	$-N(CH_3)_3^+$	Albumin: 130 mg/ml
	ENrich S	Strong cation exchange	$-SO_3^-$	IgG: 120 mg/ml
	ENrich SEC	Size exclusion	–	500–70,000 Da 5,000–650,000 Da

* Binding capacity based on bulk media; check individual instruction manuals for run conditions and specifications.

continues

Prepacked Column Selection Guide by Application

Application	Media	Type of Separation	Chemical Form	Binding Capacity/ml
Desalting, Buffer Exchange	Bio-Gel P-6	Gel filtration	Polyacrylamide	CV: 10–22%
Purification of Serum Proteins, Enzymes	Affi-Gel Blue	Affinity	Cibacron Blue F3GA	Serum: 0.2 ml; albumin: 11 mg
Plasmid Purification	Macro-Prep High Q	Strong anion exchange	$-\text{N}(\text{CH}_3)_3^+$	BSA: ≥ 37 mg
	UNOsphere Q	Strong anion exchange	$-\text{N}(\text{CH}_3)_3^+$	BSA: 180 mg
	UNOsphere S	Strong cation exchange	$-\text{SO}_3^-$	Human IgG: 60 mg
	Macro-Prep DEAE	Weak anion exchange	$-\text{HN}^+(\text{C}_2\text{H}_5)_2$	Protein: >35 mg
	CHT	Hydroxyapatite	$\text{Ca}_5(\text{PO}_4)_3(\text{OH})_2$	Human IgG: 25–60 mg/ml*
	MPC	Hydroxyfluoroapatite	$\text{Ca}_{10}(\text{PO}_4)_6(\text{OH})_{1.5}(\text{F})_{0.5}$	Human IgG: 25–50 mg/ml
CFT	Fluoroapatite	$\text{Ca}_{10}(\text{PO}_4)_6\text{F}_2$	Lysozyme: 14–21.5 mg/g	

* Binding capacity based on bulk media; check individual instruction manuals for run conditions and specifications.

ENrich High-Resolution Ion Exchange Columns

ENrich ion exchange columns are designed for high-resolution separations at fast flow rates. ENrich columns run at low backpressures on the NGC chromatography system or any other medium- to high-pressure purification system. This allows more flow rate flexibility in both sample viscosities and temperature conditions. The 1 ml ENrich column can complete a high-resolution separation in about 10 minutes. ENrich columns are also available in 8 ml sizes.

The unique polymeric resin features:

- High capacity even at high flow rates
- Superior quality, reproducible separations
- Lower backpressure than similar resins
- Stability from pH 2–12
- Available for strong anion (Q) and strong cation (S) exchange



ENrich glass columns — provide high-resolution separation of biomolecules. The durable borosilicate glass tube and PEEK 10-32 female end fittings are compatible with all aqueous solvents.

For More Information
Visit bio-rad.com/ENrich

See Also

Ion exchange chromatography standards: page 122.

Ordering Information

Catalog #	Description	Column Volume, ml	Recommended Maximum Protein Load, mg/column	Column Flow Dimensions (W x L), mm	Maximum Operating Pressure		
					psi	MPa	bar
ENrich High-Resolution Ion Exchange Columns							
7800001	ENrich Q 5 x 50 Column	1	100	5 x 50	500	3.45	34.5
7800003	ENrich Q 10 x 100 Column	8	800	10 x 100	500	3.45	34.5
7800021	ENrich S 5 x 50 Column	1	100	5 x 50	500	3.45	34.5
7800023	ENrich S 10 x 100 Column	8	800	10 x 100	500	3.45	34.5
Fittings							
7500564	Fitting Adapters 1/4"-28F to 10-32M , pkg of 2, fittings to connect one HPLC column (10-32) to BioLogic DuoFlow and NGC systems						
7500568	UNO 10-32 Fittings Kit , includes 2 nuts and 4 ferrules to connect UNO column to an HPLC system, for use with BioLogic DuoFlow and NGC systems						
7800008	Fittings, 10-32 PEEK , black, 2/PK						
7800091	ENrich 5 Frit Kit , includes 2 frits, 1 frit remover, 2 O-rings						
7800093	ENrich 10 Frit Kit , includes 2 frits, 1 frit remover, 2 O-rings						

ENrich High-Resolution Size Exclusion Columns

ENrich size exclusion columns are designed for high resolution at fast flow rates. ENrich columns run at low backpressures on the NGC chromatography system or any other medium- to high-pressure purification system. This allows more flow rate flexibility in both sample viscosities and temperature conditions. The 24 ml ENrich column can complete a high-resolution separation in less than 30 minutes at a flow rate of 1 ml/min.

The unique polymeric resin features:

- High resolution based on size
- Superior quality, reproducible separations
- Lower backpressure than similar resins
- Stability from pH 2–12
- Separation ranges from 500–70,000 and 5,000–650,000 Da



ENrich glass columns — provide high-resolution separation of biomolecules. The durable borosilicate glass tube and PEEK 10-32 female end fittings are compatible with all aqueous solvents.

For More Information
Web: bio-rad.com/ENrich

Ordering Information

Catalog #	Description	Column Volume, ml	Separation Range Globular Proteins, Da	Column Dimensions (W x L), mm	Maximum Operating Pressure		
					psi	MPa	bar
ENrich High-Resolution Ion Exchange Columns							
7801070	ENrich SEC 70 10 x 300 Column	24	500–70,000	10 x 300	600	4.1	41
7801650	ENrich SEC 650 10 x 300 Column	24	5,000–650,000	10 x 300	600	4.1	41
Catalog #	Description						
Fittings							
7500564	Fitting Adapters 1/4"-28F to 10-32M , pkg of 2, fittings to connect one HPLC column (10-32) to BioLogic DuoFlow and NGC systems						
7500568	UNO 10-32 Fittings Kit , includes 2 nuts and 4 ferrules to connect UNO column to an HPLC system, for use with BioLogic DuoFlow and NGC systems						
7800008	Fittings, 10-32 PEEK , black, 2/PK						
7800093	ENrich 10 Frit Kit , includes 2 frits, 1 frit remover, 2 O-rings						
Catalog #	Description	Contents	MW	pI	For Use with		
Standard							
1511901	Gel Filtration Standard , 6 vials	Thyroglobulin Bovine γ -globulin Chicken ovalbumin Equine myoglobin Vitamin B ₁₂	670,000 158,000 44,000 17,000 1,350	4.5 5.1 4.6 6.9 4.5	ENrich SEC columns; Bio-Gel P media		

EconoFit Chromatography Columns

EconoFit chromatography columns are prepacked and easy to use with a range of Bio-Rad's chromatography resins, offering scientists convenience and reliability from lab scale through process development. The columns' flexible formats, high pressure rating, and easy connection allow researchers to easily get started with their purification.

- Available in a variety of different resin formats for a range of purification needs
- Standard 10-32 fittings for easy connection to many different chromatography instruments

- High pressure (72 psi) rating to meet different experimental needs
- Prepacked and ready-to-use formats designed to save time

For use with NGC systems or any chromatography system.

For More Information
Web: bio-rad.com/econofit

Ordering Information

Catalog #	Description
12009234	EconoFit Affi-Gel Blue Column , 1 x 5 ml, prepacked affinity column, 16 x 25 mm, maximum pressure 10 psi
12009235	EconoFit Affi-Gel Blue Columns , 5 x 5 ml, prepacked affinity columns, 16 x 25 mm, maximum pressure 10 psi
12009237	EconoFit Affi-Prep Protein A Column , 1 x 5 ml, prepacked affinity column, 16 x 25 mm, maximum pressure 72 psi
12009236	EconoFit Affi-Prep Protein A Columns , 5 x 1 ml, prepacked affinity columns, 7 x 25 mm, maximum pressure 72 psi
12009238	EconoFit Bio-Gel P-6 Desalting Column , 1 x 5 ml, column filled with Bio-Gel P-6 gel filtration (size exclusion) chromatography support; 16 mm x 25 mm, maximum pressure 72 psi. For desalting or buffer exchange
12009239	EconoFit Bio-Gel P-6 Desalting Columns , 5 x 5 ml, columns filled with Bio-Gel P-6 gel filtration (size exclusion) chromatography support; 16 x 25 mm, maximum pressure 72 psi. For desalting or buffer exchange
12009252	EconoFit CFT Type II, 40 µm Column , 1 x 1 ml, prepacked mixed-mode column, 7 x 25 mm, maximum pressure 72 psi
12009240	EconoFit CFT Type II, 40 µm Column , 1 x 5 ml, prepacked mixed-mode column, 16 x 25 mm, maximum pressure 72 psi
12009251	EconoFit CFT Type II, 40 µm Columns , 5 x 5 ml, prepacked mixed-columns, 7 x 25 mm, maximum pressure 72 psi
12009255	EconoFit CHT Type I, 40 µm Column , 1 x 1 ml, prepacked mixed-mode column, 7 x 25 mm, maximum pressure 72 psi
12009253	EconoFit CHT Type I, 40 µm Column , 1 x 5 ml, prepacked mixed-mode column, 16 x 25 mm, maximum pressure 72 psi
12009254	EconoFit CHT Type I, 40 µm Columns , 5 x 5 ml, prepacked mixed-mode columns, 16 x 25 mm, maximum pressure 72 psi
12009256	EconoFit CHT Type I, 80 µm Column , 1 x 1 ml, prepacked mixed-mode column, 7 x 25 mm, maximum pressure 72 psi
12009259	EconoFit CHT Type II, 40 µm Column , 1 x 1 ml, prepacked mixed-mode column, 7 x 25 mm, maximum pressure 72 psi
12009257	EconoFit CHT Type II, 40 µm Column , 1 x 5 ml, prepacked mixed-mode column, 16 x 25 mm, maximum pressure 72 psi
12009258	EconoFit CHT Type II, 40 µm Columns , 5 x 5 ml, prepacked mixed-mode columns, 16 x 25 mm, maximum pressure 72 psi
12009260	EconoFit CHT Type II, 80 µm Column , 1 x 1 ml, prepacked mixed-mode columns, 7 mm x 25 mm, maximum pressure 72 psi
12009261	EconoFit CHT XT Column , 1 x 1 ml, prepacked mixed-mode column, 7 mm x 25 mm, maximum pressure 72 psi
12009262	EconoFit DEAE Affi-Gel Blue Column , 1 x 5 ml, prepacked affinity column, 16 mm x 25 mm, maximum pressure 10 psi
12009263	EconoFit DEAE Affi-Gel Blue Columns , 5 x 5 ml, prepacked affinity columns, 16 mm x 25 mm, maximum pressure 10 psi
12009232	EconoFit X Empty Columns , 5 x 1 ml, empty chromatography columns, 7 mm x 25 mm, maximum pressure 72 psi

continues

Chromatography Columns

Prepacked Chromatography Columns

bio-rad.com/econofit

Ordering Information

Catalog #	Description
12009233	EconoFit X Empty Columns , 5 x 5 ml, empty chromatography columns, 16 mm x 25 mm, maximum pressure 72 psi
12009273	EconoFit Macro-Prep CM Column , 1 x 1 ml, prepacked ion exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009274	EconoFit Macro-Prep DEAE Column , 1 x 1 ml, prepacked ion exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009265	EconoFit Macro-Prep DEAE Column , 1 x 5 ml, prepacked ion exchange column, 16 mm x 25 mm, maximum pressure 72 psi
12009264	EconoFit Macro-Prep DEAE Columns , 5 x 1 ml, prepacked ion exchange columns, 7 mm x 25 mm, maximum pressure 72 psi
12009266	EconoFit Macro-Prep DEAE Columns , 5 x 5 ml, prepacked ion exchange columns, 16 mm x 25 mm, maximum pressure 72 psi
12009275	EconoFit Macro-Prep High Q Column , 1 x 1 ml, prepacked ion exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009268	EconoFit Macro-Prep High Q Column , 1 x 5 ml, prepacked ion exchange column, 16 mm x 25 mm, maximum pressure 72 psi
12009267	EconoFit Macro-Prep High Q Columns , 5 x 1 ml, prepacked ion exchange columns, 7 mm x 25 mm, maximum pressure 72 psi
12009269	EconoFit Macro-Prep High Q Columns , 5 x 5 ml, prepacked ion exchange columns, 16 mm x 25 mm, maximum pressure 72 psi
12009283	EconoFit Macro-Prep High Q-3HT Column , 1 x 1 ml, prepacked ion exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009276	EconoFit Macro-Prep High S Column , 1 x 1 ml, prepacked ion exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009271	EconoFit Macro-Prep High S Column , 1 x 5 ml, prepacked ion exchange column, 16 mm x 25 mm, maximum pressure 72 psi
12009270	EconoFit Macro-Prep High S Columns , 5 x 1 ml, prepacked ion exchange columns, 7 mm x 25 mm, maximum pressure 72 psi
12009272	EconoFit Macro-Prep High S Columns , 5 x 5 ml, prepacked ion exchange columns, 16 mm x 25 mm, maximum pressure 72 psi
12009277	EconoFit Macro-Prep Methyl HIC Column , 1 x 1 ml, prepacked hydrophobic interaction column, 7 mm x 25 mm, maximum pressure 72 psi
12009278	EconoFit Macro-Prep t-Butyl HIC Column , 1 x 1 ml, prepacked hydrophobic interaction column, 7 mm x 25 mm, maximum pressure 72 psi
12009279	EconoFit MPC I-40 Column , 1 x 1 ml, prepacked mixed-mode column, 7 mm x 25 mm, maximum pressure 72 psi
12009280	EconoFit Nuvia aPrime 4A Column , 1 x 1 ml, prepacked hydrophobic anion exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009281	EconoFit Nuvia cPrime Column , 1 x 1 ml, prepacked hydrophobic cation exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009282	EconoFit Nuvia HP-Q Column , 1 x 1 ml, prepacked ion exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009284	EconoFit Nuvia HR-S Column , 1 x 1 ml, prepacked ion exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009288	EconoFit Nuvia IMAC Column , 1 x 1 ml, prepacked Ni-charged column, 7 mm x 25 mm, maximum pressure 72 psi
12009286	EconoFit Nuvia IMAC Column , 1 x 5 ml, prepacked Ni-charged column, 16 mm x 25 mm, maximum pressure 72 psi
12009285	EconoFit Nuvia IMAC Columns , 5 x 1 ml, 1 ml, prepacked Ni-charged columns, 7 mm x 25 mm, maximum pressure 72 psi
12009287	EconoFit Nuvia IMAC Columns , 5 x 5 ml, prepacked Ni-charged columns, 16 mm x 25 mm, maximum pressure 72 psi
12009289	EconoFit Nuvia IMAC Uncharged Column , 1 x 1 ml, prepacked uncharged IMAC column, 7 mm x 25 mm, maximum pressure 72 psi
12009290	EconoFit Nuvia Q Column , 1 x 1 ml, prepacked ion exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009291	EconoFit Nuvia S Column , 1 x 1 ml, prepacked ion exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009292	EconoFit Profinity eXact Column , 1 x 1 ml, prepacked affinity column, 7 mm x 25 mm, maximum pressure 72 psi

continues

Ordering Information

Catalog #	Description
12009294	EconoFit Profinity eXact Column , 1 x 5 ml, prepacked affinity column, 16 mm x 25 mm, maximum pressure 72 psi
12009293	EconoFit Profinity eXact Columns , 5 x 1 ml, prepacked affinity columns, 7 mm x 25 mm, maximum pressure 72 psi
12009296	EconoFit Profinity GST Column , 1 x 5 ml, prepacked affinity column, 16 mm x 25 mm, maximum pressure 72 psi
12009295	EconoFit Profinity GST Columns , 5 x 1 ml, prepacked affinity columns, 7 mm x 25 mm, maximum pressure 72 psi
12009297	EconoFit Profinity GST Columns , 5 x 5 ml, prepacked affinity columns, 16 mm x 25 mm, maximum pressure 72 psi
12009299	EconoFit Profinity IMAC Column , 1 x 5 ml, prepacked Ni-charged column, 16 mm x 25 mm, maximum pressure 72 psi
12009298	EconoFit Profinity IMAC Columns , 5 x 1 ml, prepacked Ni-charged column, 7 mm x 25 mm, maximum pressure 72 psi
12009300	EconoFit Profinity IMAC Columns , 5 x 5 ml, prepacked Ni-charged columns, 16 mm x 25 mm, maximum pressure 72 psi
12009307	EconoFit UNOsphere Q Column , 1 x 1 ml, prepacked ion exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009302	EconoFit UNOsphere Q Column , 1 x 5 ml, prepacked ion exchange column, 16 mm x 25 mm, maximum pressure 72 psi
12009301	EconoFit UNOsphere Q Columns , 5 x 1 ml, prepacked ion exchange columns, 7 mm x 25 mm, maximum pressure 72 psi
12009303	EconoFit UNOsphere Q Columns , 5 x 5 ml, prepacked ion exchange columns, 16 mm x 25 mm, maximum pressure 72 psi
12009308	EconoFit UNOsphere S Column , 1 x 1 ml, prepacked ion exchange column, 7 mm x 25 mm, maximum pressure 72 psi
12009305	EconoFit UNOsphere S Column , 1 x 5 ml, prepacked ion exchange column, 16 mm x 25 mm, maximum pressure 72 psi
12009304	EconoFit UNOsphere S Columns , 5 x 1 ml, prepacked ion exchange columns, 7 mm x 25 mm, maximum pressure 72 psi
12009306	EconoFit UNOsphere S Columns , 5 x 5 ml, prepacked ion exchange columns, 16 mm x 25 mm, maximum pressure 72 psi
12009321	EconoFit UNOsphere SUPrA Column , 1 x 1 ml, prepacked UNOsphere SUPrA affinity column, 7 mm x 25 mm, maximum pressure 72 psi
12009323	EconoFit UNOsphere SUPrA Column , 1 x 5 ml, prepacked UNOsphere SUPrA affinity column, 16 mm x 25 mm, maximum pressure 72 psi
12009322	EconoFit UNOsphere SUPrA Columns , 5 x 1 ml, prepacked UNOsphere SUPrA affinity column, 7 mm x 25 mm, maximum pressure 72 psi

Foresight Prepacked Plates and Columns

Foresight plates and columns are prepacked with a range of Bio-Rad's process chromatography resins, offering process scientists convenience and reliability for their high-throughput experimentation needs. The products' robust design allows researchers to use the prepacked formats through the entire purification development cycle, from high-throughput resin screening to small-scale method development and scale-up optimization.

Benefits include:

- Prepacked and ready-to-use formats designed to save process development time
- Ability to evaluate different experimental conditions to better define an operational window
- Ability to perform high-throughput experiments with minimum sample requirements
- Available in a variety of chromatography modes that are designed for large-scale bioprocess
- Compatible with robotic liquid handling workstations
- Standard 10-32 male end fittings for easy connection of column to many chromatography systems



For More Information

Web: bio-rad.com/foresight

Request or download bulletin: 6297

Ordering Information

Catalog #	Description
Foresight Plates*	
732-4714	Foresight UNOsphere Q, 20 µl
732-4710	Foresight UNOsphere S, 20 µl
732-4703	Foresight Nuvia Q, 20 µl
732-4701	Foresight Nuvia S, 20 µl
732-4707	Foresight Nuvia HR-S, 20 µl
12006908	Foresight Nuvia HP-Q, 20 µl
732-4705	Foresight Nuvia cPrime, 20 µl
732-4716	Foresight CHT Type I, 40 µm, 20 µl
732-4718	Foresight CHT Type II, 40 µm, 20 µl
732-4785	Foresight MPC Type I, 40 µm, 20 µl
12004035	Foresight Nuvia IMAC Ni-Charged, 20 µl

continues

Chromatography Columns

Prepacked Chromatography Columns

bio-rad.com/foresight

See Also

Ion exchange chromatography standards: page 122.

Ordering Information

Description	1 ml	5 ml
Foresight Columns		
Foresight UNOsphere Q	732-4732	732-4752
Foresight UNOsphere S	732-4730	732-4750
Foresight Nuvia Q	732-4721	732-4741
Foresight Nuvia S	732-4720	732-4740
Foresight Nuvia HR-S	732-4723	732-4743
Foresight Nuvia HP-Q	12007020	12007021
Foresight Nuvia cPrime	732-4722	732-4742
Foresight CHT Type I, 40 µm	732-4735	732-4755
Foresight CHT Type II, 40 µm	732-4736	732-4756
Foresight MPC Type I, 40 µm	732-4737	732-4757
Foresight Nuvia IMAC Ni-Charged	12004038	12004037
Description	200 µl	600 µl
Foresight RoboColumn Units****		
Foresight UNOsphere Q	732-4819	732-4820
Foresight UNOsphere S	732-4813	732-4814
Foresight Nuvia Q	732-4804	732-4805
Foresight Nuvia S	732-4801	732-4802
Foresight Nuvia HR-S	732-4831	732-4832
Foresight Nuvia HP-Q	12007013	12007014
Foresight Nuvia cPrime	732-4807	732-4808
Foresight CHT Type I, 40 µm	732-4822	732-4823
Foresight CHT Type II, 40 µm	732-4825	732-4826
Foresight MPC Type I, 40 µm	732-4828	732-4829
Foresight Nuvia IMAC Ni-Charged	12004051	12004052

Catalog# Description

Fittings

7601311	Long Fingertight Fittings , 10-32 x 1.03", for connecting 1/16" PEEK and Tefzel tubing to an FPLC system, 4
7500564	Fitting Adapters 1/4"-28F to 10-32M , pkg of 2, fittings to connect one HPLC column (10-32) to BioLogic DuoFlow and NGC systems

* Package size: 2 x 96-well plates.

** Package size: 1 row of 8 columns.

*** Foresight RoboColumn units are to be used with robotic liquid handling workstations.

For more information on prepacked columns and plates, please visit bio-rad.com/foresight.

Chromatography Columns

Prepacked Chromatography Columns

bio-rad.com/cartridges

See Also

Bottled resins:
page 81.
BioLogic LP
systems: page 170.

Bio-Scale Mini Cartridges

Bio-Scale Mini cartridges have a double-wall cartridge design that provides extra durability and allows easy, reliable runs at pressures up to 45 psi using the aqueous buffers most commonly employed for protein separation. The cartridges are prepacked with Bio-Rad's chromatography resins for ion exchange, affinity, size exclusion, or hydroxyapatite technology and are available in 1, 5, 10, and 50 ml formats. Bio-Scale Mini cartridges are convenient and ready to use.

The cartridges can be used with any chromatography system and are ideal with the NGC chromatography systems, BioLogic systems, or a peristaltic pump. For simple step elution, the cartridges can be used with a luer lock syringe. Fittings are available for connection to HPLC and FPLC systems.

Bio-Scale Mini Nuvia IMAC cartridges are 5 ml Bio-Scale Mini cartridges filled with Nuvia Ni-charged IMAC resin. They are used for the purification of recombinant histidine (His)-tagged proteins by immobilized metal affinity chromatography (IMAC).



For More Information

Web: bio-rad.com/cartridges

Download bulletins: 5444, 5574, and 5584

Ordering Information

Description	1 x 1 ml	5 x 1 ml	1 x 5 ml	5 x 5 ml
Prepacked Cartridge Media Type				
UNOsphere Q	—	7324100	7324102	7324104
UNOsphere S	—	7324110	7324112	7324114
UNOsphere SUPrA rProtein A	7324200	7324201	7324202	—
Nuvia S	7324420	7324421	7324422	7324423
Macro-Prep High Q	—	7324120	7324122	7324124
Macro-Prep High S	—	7324130	7324132	7324134
Macro-Prep DEAE	—	7324140	7324142	7324144
Affi-Prep Protein A	—	7324600	7324602	—
Nuvia IMAC	—	—	7800811	7800812
Profinity IMAC Ni-Charged	—	7324610	7324612	7324614
Profinity GST	—	7324620	7324622	7324624
DEAE Affi-Gel Blue	—	—	7324632	7324634
Affi-Gel Blue	—	—	7324642	7324644
CHT Type I, 40 µm	—	—	7324322	7324324
CHT Type II, 40 µm	—	—	7324332	7324334
CFT Type II	—	—	7324405	7324406

Description	Pack of 1	Pack of 5
Bio-Gel P-6, 10 ml	—	7325304
Bio-Gel P-6, 50 ml	7325312	7325314

Catalog # Description

Adaptor Fittings

7885010	Luer to 10-32 Adaptor Fittings Kit , includes female slip luer to female 10-32 fitting to connect male end of luer column to NGC system
7320111	Luer to M6 Adaptor Fittings Kit , includes luer to M6 fittings to connect 1 cartridge to an FPLC system
7320112	Luer to 10-32 Adaptor Fittings Kit , includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system or NGC system
7320113	Luer to BioLogic and NGC Systems Fittings Kit , low-pressure system fittings kit, includes 1/4–28 female to male and 1/4–28 female to female luers to connect 1 cartridge to BioLogic DuoFlow and NGC systems

Bio-Scale Mini Cartridge Purification Sampler Packs and Kits

Protein purification sampler packs offer a quick way to experiment with separation techniques when the protein to be purified has not yet been characterized.

The Bio-Scale Mini ion exchange sampler pack includes a 1 ml UNOsphere Q cartridge, 1 ml UNOsphere S cartridge, 1 ml Macro-Prep Q cartridge, 1 ml Macro-Prep S cartridge, and 1 ml Macro-Prep DEAE cartridge.

The Bio-Scale Mini affinity sampler pack includes a 1 ml Profinity IMAC cartridge, 1 ml Profinity GST cartridge, 1 ml Affi-Prep Protein A cartridge, 5 ml DEAE Affi-Gel Blue cartridge, and 5 ml Affi-Gel Blue cartridge.

The Bio-Scale Mini mAb purification cartridge kit includes the three most commonly used media for purification of monoclonal antibody. The kit includes a UNOsphere SUPrA affinity cartridge for capture, a UNOsphere Q cartridge for the intermediate step, and a CHT Type I, 40 µm cartridge for the polishing step.

A list of all cartridges is included above in Ordering Information for Bio-Scale Mini cartridges. For a list of all prepacked columns, see page 124.

For More Information
Web: bio-rad.com/resinsampling

See Also

Ion exchange chromatography standards: page 122.

Ordering Information

Catalog #	Description
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Bio-Scale Mini Cartridge Purification Sampler Packs and Kits

7324650	Bio-Scale Mini Ion Exchange Sampler Pack , includes one 1 ml cartridge each of UNOsphere S, UNOsphere Q, Macro-Prep High Q, Macro-Prep High S, Macro-Prep DEAE
7324651	Bio-Scale Mini Affinity Sampler Pack , includes one 1 ml cartridge each of Profinity IMAC, Affi-Prep Protein A, Profinity GST, one 5 ml cartridge each of DEAE Affi-Gel Blue and Affi-Gel Blue
7324407	Bio-Scale Mini Apatite Purification Cartridge Kit , includes one each of prepacked CFT ceramic fluoroapatite Type II, 40 µm, and CHT ceramic hydroxyapatite Type I and II, 40 µm, mixed-mode chromatography media cartridges, 1 x 5 ml each
7324408	Bio-Scale Mini mAb Purification Cartridge Kit , includes one each, 5 ml prepacked UNOsphere SUPrA affinity media, UNOsphere Q media, and CHT ceramic hydroxyapatite Type I, 40 µm, cartridges

Adaptor Fittings

7885010	Luer to 10-32 Adaptor Fittings Kit , includes female slip luer to female 10-32 fitting to connect male end of luer column to NGC system
7320111	Luer to M6 Adaptor Fittings Kit , includes luer to M6 fittings to connect 1 cartridge to an FPLC system
7320112	Luer to 10-32 Adaptor Fittings Kit , includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system or NGC system
7320113	Luer to BioLogic and NGC Systems Fittings Kit , low-pressure system fittings kit, includes 1/4–28 female to male and 1/4–28 female to female luers to connect 1 cartridge to BioLogic DuoFlow and NGC systems

Chromatography Columns

Prepacked Chromatography Columns

bio-rad.com/biospin

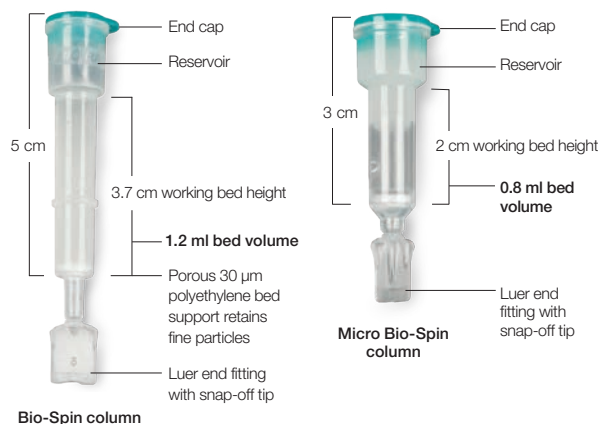
See Also

Nucleic acid sample preparation: page 9.

Bio-Spin and Micro Bio-Spin Columns

Bio-Spin P-6 and Micro Bio-Spin P-6 columns are ideal for desalting protein samples quickly using size exclusion chromatography. Filled with Bio-Gel P-6 or P-30 resin, these columns are shipped fully hydrated in Tris buffer and are ready to use. These products effectively clean up and remove salts, nucleotides, dye terminators, and small molecules from protein, RNA, and DNA samples in just 10 minutes. The columns are autoclavable.

- Provide fast salt and contaminant removal in an easy-to-use spin-column format
- Remove compounds <6 kD by size exclusion chromatography
- Accommodate up to 100 µl of sample (Bio-Spin columns)
- Accommodate up to 70 µl of sample (Micro Bio-Spin columns)



Bio-Spin column

Micro Bio-Spin column

For More Information
Web: bio-rad.com/biospin

Bio-Spin Column Selection Guide

	Bio-Spin P-6	Micro Bio-Spin P-6	Bio-Spin P-30	Micro Bio-Spin P-30
Equilibration buffer	SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*	SSC buffer*	10 mM Tris, pH 7.4, or SSC buffer*
Applications	Desalting and buffer exchange	Desalting and buffer exchange	Desalting; nucleotide and small molecule removal	DNA sequencing reaction mixtures (Tris) and small molecule removal
Retention and recovery	90% recovery of 20 bases or bp, 99% retention of salts	90% recovery of 20 bases or bp, 99% retention of salts	95% recovery of 22 bases or bp, 98% retention of ddNTPs	95% recovery of 22 bases or bp, 98% retention of ddNTPs
MW exclusion limit, globular proteins	6,000	6,000	40,000	40,000
Sample volume	50–100 µl	10–75 µl	50–100 µl	10–75 µl
Centrifuge type	Swinging bucket	Microcentrifuge	Swinging bucket	Microcentrifuge

* 150 mM NaCl, 17.5 mM sodium citrate, pH 7.0.

Ordering Information

Catalog #	Description
7326227	Bio-Spin P-6 Columns , 25 with Tris buffer
7326228	Bio-Spin P-6 Columns , 100 with Tris buffer
7326221	Micro Bio-Spin P-6 Columns , 25 with Tris buffer
7326222	Micro Bio-Spin P-6 Columns , 100 with Tris buffer
7326006	Bio-Spin P-30 Columns , 25 with SSC buffer
7326202	Micro Bio-Spin P-30 Columns , 25 with SSC buffer
7326203	Micro Bio-Spin P-30 Columns , 100 with SSC buffer

Go to bio-rad.com/cartridges for current information on prepacked cartridges.

See Also

ProteoMiner protein enrichment system: page 7.

Mini Bio-Spin Columns

Mini Bio-Spin columns are available with 0.6 ml prepacked resin for both affinity-tagged purification and protein enrichment applications. The columns contain Profinity eXact resins for affinity-tagged purification and on-column cleavage; see page 106.

For More Information

Web: bio-rad.com/minibiospin

Download bulletins: Profinity eXact fusion-tag system — 5725, 5742, and 5766; ProteoMiner beads — 3096 and 5635



Ordering Information

Catalog #	Description
1563007*	Profinity eXact Mini Spin Columns , includes ten 0.6 ml spin columns, ten 2 ml capped tubes, and ten 2 ml capless tubes

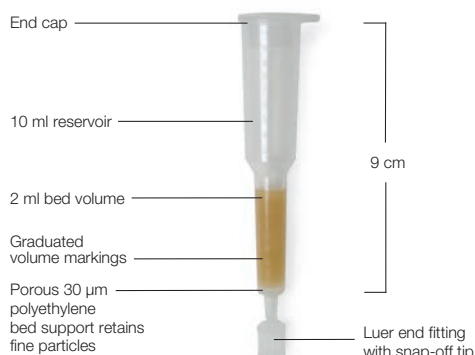
* For ProteoMiner kits, see page 7.

Poly-Prep Ion Exchange Columns

Poly-Prep prepacked columns for gravity-flow chromatography provide convenience for sample preparation and other small-scale applications. The graduated polypropylene columns hold a standard bed volume of 2 ml of AG ion exchange resin and include an integral 10 ml reservoir. A Poly-Prep stack cap, which allows connection to pumps, reservoirs, or columns in series, is also available.

For More Information

Web: bio-rad.com/polyprep



Ordering Information

Catalog #	Description	Particle Size, µm	Ionic Form	Application
7316211	Poly-Prep Columns , AG 1-X8 resin, 100–200 mesh, 50	106–180	Chloride	Separation of low molecular weight inorganic anions
7316212	Poly-Prep Columns , AG 1-X8 resin, 200–400 mesh, 50	45–106	Chloride	For high-resolution random separations
7316221	Poly-Prep Columns , AG 1-X8 resin, 200–400 mesh, 50	45–106	Formate	Separation of low molecular weight biological compounds such as nucleotides, peptides, and carboxylic acids
7316213	Poly-Prep Columns , AG 50W-X8, 100–200 mesh, 50	106–250	Hydrogen	Separation and concentration of low molecular weight cations such as small peptides and amino acids
7316214	Poly-Prep Columns , AG 50W-X8, 200–400 mesh, 50	63–150	Hydrogen	For high-resolution random separations
7311555	Poly-Prep Column Stack Cap , 50			Allows connection of pumps, reservoirs, or columns in series
7328102	Stopcock, Lock 2-Way Luer , 10			Provides control of flow through Poly-Prep columns

Chromatography Columns

Prepacked Chromatography Columns

bio-rad.com/columns

See Also

Bio-Scale replacement parts: page 147.
 NGC systems: page 148.
 CHT ceramic hydroxyapatite: page 97.
 Bio-Scale Mini cartridges: page 132.

Bio-Scale CHT Type I Columns

Bio-Scale CHT Type I columns are packed with CHT ceramic hydroxyapatite, Type I 10 µm resin, which has high affinity for basic proteins and lower affinity for acidic proteins. These prepacked columns allow rapid, reproducible high-resolution separations for analytical to semipreparative medium-pressure applications. These columns are ideal for use with any medium- to high-pressure chromatography system. Available bed volumes are 2, 5, 10, and 20 ml.

Bio-Scale CHT Type I Column Top-Off Support Kit

If the top of the column bed becomes fouled and the usual hygiene steps do not restore performance, a few milliliters



of the bed can be removed and replaced with fresh support. The Bio-Scale CHT Type I column top-off support kit contains 1 ml support, frits, and distribution screens for each column diameter.

For More Information

Web: bio-rad.com/bioscaleCHT

Ordering Information

Catalog #	Description	Column Volume, ml	Recommended Flow Rate, ml/min	Recommended Flow Rate, ml/min	Column Dimensions (W x L), mm	Maximum Operating Pressure, psi
7510021	Bio-Scale CHT2-I Column	2	20	0.5–3.0	7 x 52	1,000
7510023	Bio-Scale CHT5-I Column	5	50	0.5–5.0	10 x 64	750
7510025	Bio-Scale CHT10-I Column	10	100	0.5–7.0	12 x 88	600
7510027	Bio-Scale CHT20-I Column	20	200	0.5–10.0	15 x 113	500
7510029	CHT-I Top-Off Support Kit, 1 ml					

See Also

UNOsphere ion exchange resin: page 84.
 NGC systems: page 148.

UNO Monolith Ion Exchange Columns

UNO monolith ion exchange columns contain a patented* continuous-bed matrix, allowing biomolecule separations at high flow rates without sacrificing resolution or capacity.

UNO columns run at low backpressures on medium- to high-pressure chromatography systems. A 1 ml UNO column can complete a high-resolution separation in about 3 minutes. UNO columns are also available in 6 and 12 ml sizes.

The unique homogeneous UNO matrix:

- Provides large pore diameters especially suited for purifying larger proteins, DNA, and virus
- Has high capacity, even at high flow rates, due to the dense network of nodules that contain the ionic functional groups. These groups are completely accessible to biomolecules via the interconnecting channels
- Has the highest quality and batch-to-batch reproducibility
- Prevents fragmentation so columns last longer
- Is stable from pH 2–12
- Is available for strong anion (Q) and strong cation (S) exchange

* U.S. patent 6,423,666.



UNO replacement columns — UNO replacement columns provide a simple bed replacement as an alternative to purchasing a new column.

UNO glass columns — UNO glass columns provide high-resolution separation of biomolecules. The transparent glass tube allows easy bed inspection and column troubleshooting. Three column sizes provide flexibility for purification protocols.

UNO polishing PEEK columns — UNO polishing columns, 0.16 ml, are a late-stage purification tool to obtain the highest resolution and recovery from small sample loads. They allow you to purify and concentrate dilute samples in one step.

For More Information

Web: bio-rad.com/unomonolith

See Also

Ion exchange chromatography standards: page 122.

Ordering Information

Catalog #	Description	Column Volume, ml	Recommended Maximum Protein Load, mg/column	Recommended Flow Rate, ml/min	Column Flow Dimensions (W x L), mm	Maximum Operating Pressure		
						psi	MPa	bar
7200001	UNO Q1 Column	1.3	20	0.5–5.0	7 x 35	700	4.5	48
7200003	UNO Q6 Column	6	90	0.5–8.0	12 x 53	700	4.5	48
7200005	UNO Q12 Column	12	180	0.5–8.0	15 x 68	700	4.5	48
7200021	UNO S1 Column	1.3	20	0.5–5.0	7 x 35	700	4.5	48
7200023	UNO S6 Column	6	90	0.5–8.0	12 x 53	700	4.5	48
7200025	UNO S12 Column	12	180	0.5–8.0	15 x 68	700	4.5	48
UNO Replacement Columns								
7200011	UNO Q1R Column	1.3	20	0.5–5.0	7 x 35	700	4.5	48
7200013	UNO Q6R Column	6	90	0.5–8.0	12 x 53	700	4.5	48
7200015	UNO Q12R Column	12	180	0.5–8.0	15 x 68	700	4.5	48
7200031	UNO SR1 Column	1.3	20	0.5–5.0	7 x 35	700	4.5	48
7200033	UNO S6R Column	6	90	0.5–8.0	12 x 53	700	4.5	48
7200035	UNO S12R Column	12	180	0.5–8.0	15 x 68	700	4.5	48
UNO Polishing PEEK Column								
7200009	UNO Q Polishing Column	0.16	2	0.1–1.0	4.6 x 10	200	1.3	14
7200029	UNO S Polishing Column	0.16	2	0.1–1.0	4.6 x 10	200	1.3	14

Catalog # Description

Fittings

- 7500554 **1/16" OD (1.6 mm) Post-Pump Fittings**, includes Delrin nut, ferrules, lock ring, 10 sets
- 7500568 **UNO 10-32 Fittings Kit**, includes 2 nuts and 4 ferrules to connect UNO column to an HPLC system, for use with BioLogic DuoFlow and NGC systems
- 7500567 **UNO M6 Fittings Kit**, includes 2 nuts and 4 ferrules to connect UNO column to an FPLC system

Aminex HPLC Columns

Aminex HPLC columns are packed with a polystyrene divinylbenzene resin. Aminex resin has high pressure stability, wide pH stability, and high column efficiency and selectivity. Aminex HPLC columns separate compounds using the ion-moderated partition chromatography technique. Aminex columns are often used in the food, beverage, and biofuel industries. Aminex columns are an industry standard for the analysis of carbohydrates, organic acids, organic bases, and other small organic molecules, including peptides and nucleic acids. To separate complex mixtures with Aminex columns, simple isocratic mobile phases (often just water) and precise temperature control are used.

Aminex columns are commonly used for USP methods under the "L" specification. Specific designations are listed in the table below.

For More Information
 Web: bio-rad.com/aminex
 Download bulletins: 1928 and 6333



See Also

Organic acid standard: page 122.
 Carbohydrate analysis standard: page 122.
 NGC systems: page 148.

Chromatography Columns

Prepacked Chromatography Columns

bio-rad.com/aminex

Ordering Information

Catalog #	Description	Guard Column*	Applications	Particle Size, μm	Ionic Form	Cross-Linkage %	pH Range	USP Number
Carbohydrate Analysis Columns								
1250143	Aminex HPX-87N Column , 300 x 7.8 mm	1250508	Beet sugars	9	Sodium	8	5–9	L58
1250142	Aminex HPX-87K Column , 300 x 7.8 mm	1250128	Molasses, corn syrup	9	Potassium	8	5–9	—
1250095	Aminex HPX-87C Column , 300 x 7.8 mm	1250128	High fructose corn syrup	9	Calcium	8	5–9	L19
1250094	Aminex HPX-87C Column , 250 x 4.0 mm	1250128	Sugar alcohols	9	Calcium	8	5–9	L19
1250098	Aminex HPX-87P Column , 300 x 7.8 mm	1250119 or 1250118	Pentose sugars, cellulose hydrolysates, biofuels	9	Lead	8	5–9	L34
1250140	Aminex HPX-87H Column , 300 x 7.8 mm	1250129	Sugars with organic acids, biofuels	9	Hydrogen	8	1–3	L17
1250096	Aminex HPX-42C Column , 300 x 7.8 mm	1250128	Oligosaccharides, thickening agents	25	Calcium	4	5–9	—
1250097	Fast Carbohydrate Column , 100 x 7.8 mm	1250119 or 1250118	Glucose, galactose, sucrose, fructose	9	Lead	8	5–9	—
1250105	Fast Carbohydrate Column , 100 x 7.8 mm	1250119 or 1250118	Glucose, galactose, sucrose, fructose	9	Lead	8	5–9	—
Organic Acid and Alcohol Columns								
1250140	Aminex HPX-87H Column , 300 x 7.8 mm	1250129	Sugars with organic acids, fermentation monitoring, biofuels	9	Hydrogen	8	1–3	L17
1250100	Fast Acid Analysis Column , 100 x 7.8 mm	1250129	Alcohol, glycol organic acid analysis	9	Hydrogen	8	1–3	—
1250115	Fermentation Monitoring Column , 150 x 7.8 mm	1250129	Sugar, acids, alcohols	9	Hydrogen	8	1–3	—
Application Kits for Food Analysis**								
1250234	Organic Acid Analysis Kit , includes 1250140, 1250129, and 1250586	Included	Organic acids	9	Hydrogen	8	1–3	—
Catalog #	Description	Applications	Ionic Form	pH Range				
Micro-Guard Cartridges								
1250118***	De-Ashing Refill Cartridges , 30 x 4.6 mm, 2	Aminex silver- and lead-form columns	H ⁺ and CO ₃ ⁻	6–8				
1250119	Carbo-P Refill Cartridges , 30 x 4.6 mm, 2	Aminex HPX-87P column	Lead	5–9				
1250128	Carbo-C Refill Cartridges , 30 x 4.6 mm, 2	Aminex calcium- and potassium-form columns	Calcium	5–9				
1250129	Cation H Refill Cartridges , 30 x 4.6 mm, 2	Aminex hydrogen-form columns	Hydrogen	1–3				
1250506	Anion CO₃⁻ Cartridges , 30 x 4.6 mm, 2	Aminex silver- and lead-form columns	CO ₃ ⁻	—				
1250508	Cation Na⁺ Cartridges , 30 x 4.6 mm, 2	Aminex HPX-87N column	Sodium	5–9				

continues

Ordering Information

Catalog #	Description	Contents	MW	pl	For Use with
Standards					
1250585	Carbohydrate Analysis Standard , 6 vials	Melezitose	504		Aminex HPX-87H column; carbohydrate analysis kit
		Maltose	360		
		Glucose	180		
		Mannose	180		
		Fructose	180		
1250586	Organic Acid Analysis Standard , 6 vials	Adonitol (ribitol)	152		Aminex HPX-87H column; organic acid analysis kit
		Sodium oxalate	134		
		Sodium citrate	294		
		Sodium malate	196		
		Sodium succinate	270		
		Sodium formate	69		
		Sodium acetate	82		

Catalog # Description

Cartridge Holders and Accessories

1250131	Standard Cartridge Holder , for one 30 x 4.6 mm cartridge
1250147	Cartridge Holder Seal Replacement Kit , for #1250131
1250148	Cartridge Holder Seals , for #1250131
1250139	De-Ashing Cartridge Holder , for #1250118, holds two 3.0 x 4.6 mm cartridges in series
7800008	Fittings, 10-32 PEEK , black, 2/PK

* Supplied as 2 guard columns.

** Includes 1 column and 2 Micro-Guard cartridges; requires standard cartridge holder, catalog #1250131.

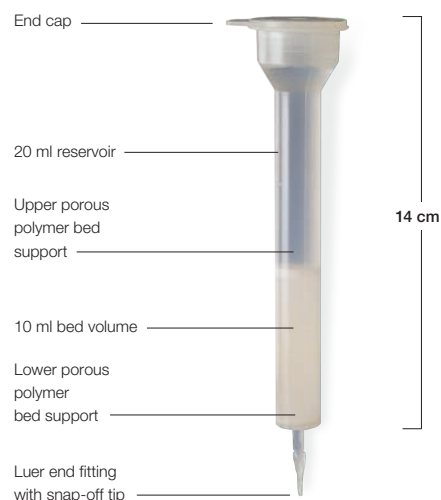
*** Requires de-ashing cartridge holder, #1250139.

Econo-Pac Affinity and Desalting Columns

Econo-Pac prepacked columns for gravity-flow chromatography allow fast and easy desalting as well as simplified antibody purification.

Econo-Pac Protein A columns are well suited for binding of IgGs, especially from mammalian species. The Econo-Pac 10DG media, with a molecular exclusion limit of 6,000, is recommended specifically for desalting and buffer exchange.

The prepacked Econo-Pac columns include an upper frit, a snap-off end tip, graduated column markings, a 10 ml bed, and 30 ml total column volume. To improve column performance, use a flow adaptor, see below. For bottled size exclusion resins, see pages 116–117; for bottled affinity resins, see pages 102–106 and 109–115; and for activated affinity resins, see pages 105 and 114–115.



See Also

Affi-Gel Protein A MAPS II kit: page 110.
Affi-Gel Protein A resin: page 110.
DEAE Affi-Gel Blue resin: page 111.

Ordering Information

Catalog #	Description
7322022	Econo-Pac Protein A Columns , prefilled with Affi-Gel Protein A media, 5
7322020	Econo-Pac Protein A Kit , 1 x 2 ml Affi-Gel Protein A column, 1 x 10 ml 10DG column, buffers
7322027	Econo-Pac Serum IgG Purification Kit , 5 x 5 ml DEAE Affi-Gel Blue columns, 5 x 10 ml 10DG columns, buffers
7322010	Econo-Pac 10DG Desalting Columns , 30
7380019	Econo-Pac Flow Adaptor , 1.5 cm column ID

Empty Columns

Bio-Rad's empty columns accommodate a range of chromatography needs, including spin columns, low-pressure columns with optional flow adaptors and jackets for temperature control, and analytical columns for medium- or high-pressure systems.

See Also

Nucleic acid sample preparation: page 9.
Prepacked Bio-Spin and Micro Bio-Spin columns: page 134.

Bio-Spin, Micro Bio-Spin, and Mini Bio-Spin Columns

Empty Bio-Spin and Micro Bio-Spin chromatography columns are disposable polypropylene spin columns that can be packed with a variety of chromatographic media. Bio-Spin columns hold up to 1.2 ml of any resin and fit in standard swinging bucket centrifuges; Micro Bio-Spin and Mini Bio-Spin columns hold up to 0.8 and 1.2 ml of

resin respectively, and fit in standard microfuges. All three columns fit standard collection tubes, have snap-off tips and polyethylene bed supports, and are autoclavable.

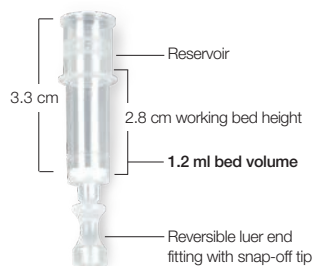
For More Information

Web: bio-rad.com/spincolumns

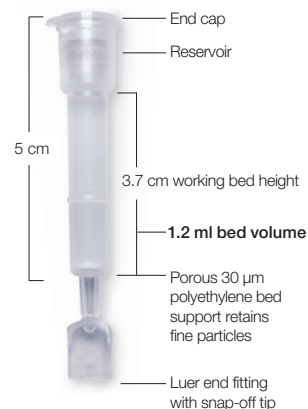
Download bulletin: 2289



Micro Bio-Spin Column



Mini Bio-Spin Column



Bio-Spin Column

Ordering Information

Catalog #	Description
7326008	Bio-Spin Chromatography Columns , empty, 100
7326025	Bio-Spin Chromatography Columns , empty, 1,000
7326204	Micro Bio-Spin Chromatography Columns , empty, 100
7326207	Mini Bio-Spin Chromatography Columns , empty, 100
7311660	End Caps , for Micro Bio-Spin chromatography columns, 1,000

Econo-Pac Columns

Econo-Pac columns are 14 cm high, 1.5 x 12 cm polypropylene columns that may be fitted with a flow adaptor (see below) or used for gravity-flow chromatography. When used for open column work, a special upper bed support prevents the bed from running dry. Bed volumes from 1–20 ml are acceptable. These columns can be autoclaved and will retain fine particles. Columns can be easily stored in poly column racks.

For More Information

Web: bio-rad.com/econopaccolumns

Download bulletin: 2289



Poly Column Rack



See Also

Prepacked Econo-Pac columns: page 139.

Ordering Information

Catalog #	Description
7321010	Econo-Pac Chromatography Columns , empty, includes upper bed supports, end caps, tip closures, 50
7321011	Econo-Pac Chromatography Columns , empty, includes upper bed supports, end caps, tip closures, 500

Accessories

7380019	Econo-Pac Flow Adaptor , 1.5 cm column ID
7317005	Poly Column Rack , 20-place, with removable tube rack
7328102	2-Way Stopcocks , female-to-male luer, 10
7318232	Female Luer Plugs , 25, polypropylene
7311660	End Caps , for Econo-Pac columns, 1,000

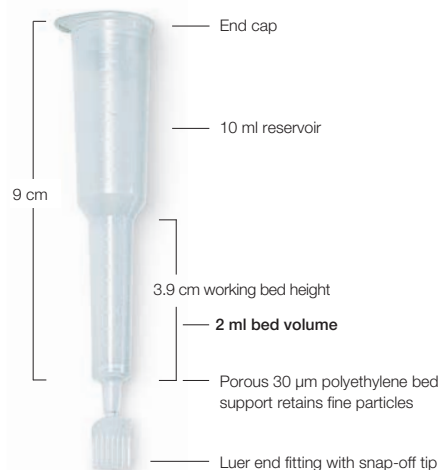
Poly-Prep Columns

Poly-Prep columns are 9 cm high, conical 0.8 x 4 cm polypropylene columns that hold up to 2 ml of chromatography resin and 10 ml of eluent or sample in an integral reservoir. These columns are ideal for sample preparation and small-scale chromatography applications, including work with radioisotopes and other applications that require disposable products. Poly-Prep columns may be autoclaved and will retain fine particles.

For More Information

Web: bio-rad.com/polyprepcolumns

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Chromatography Columns

Empty Columns

bio-rad.com/econocolumns

Ordering Information

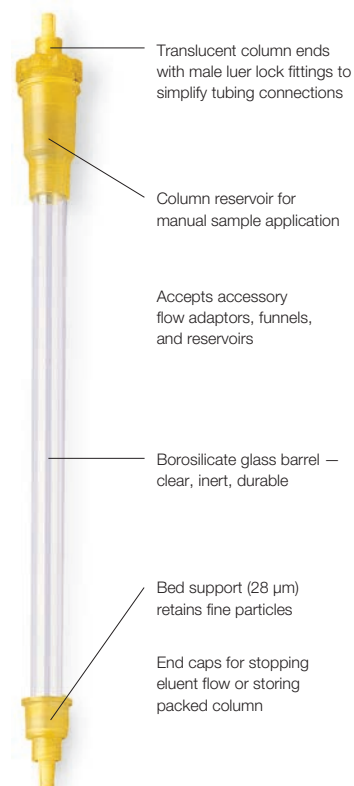
Catalog #	Description
7311550	Poly-Prep Chromatography Columns , empty, includes end caps and tip closures, 50
7311553	Poly-Prep Chromatography Columns , empty, includes end caps and tip closures, 1,000

Accessories

7311555	Poly-Prep Column Stack Cap , 50
7317005	Poly Column Rack , 20-place, with removable tube rack
7328102	2-Way Stopcocks , female-to-male luer, 10
7318232	Female Luer Plugs , polypropylene, 25
7311660	End Caps , for disposable plastic columns, 1,000

Glass Econo-Column Columns

Econo-Column chromatography columns are the standard for high-quality, affordable low-pressure chromatography columns. Columns ranging from 5 to 170 cm in length and 0.5–5.0 cm in diameter are available. A porous polymer bed support at the bottom of the column retains fine particles, and translucent polypropylene end fittings allow viewing of the entire column bed. Econo-Column chromatography columns can be autoclaved and are designed to operate at pressures <1 bar (14.7 psi). Econo-Column chromatography columns accept Econo-Column funnels as well as Econo-Column flow adaptors. Econo-Column chromatography columns are packaged in quantities of 1, 2, and 4, depending on column diameter and length. For convenience, all packaging sizes contain one stopcock per column ordered.



For More Information

Web: bio-rad.com/econocolumns

Download bulletin: 2289

Ordering Information

Catalog #	ID, cm	Length, cm	Cross-Sectional Area, cm ²	Maximum Volume, ml	Columns/Pkg
7370507	0.5	5	0.20	1	2
7374506	0.5	5	0.20	1	4
7374511	0.5	10	0.20	2	4
7370517	0.5	15	0.20	3	2
7374521	0.5	20	0.20	4	4
7370707	0.7	5	0.39	2	2
7374706	0.7	5	0.39	2	4
7370712	0.7	10	0.39	4	2
7374711	0.7	10	0.39	4	4
7370717	0.7	15	0.39	6	2
7374716	0.7	15	0.39	6	4
7374721	0.7	20	0.39	8	4
7370732	0.7	30	0.39	12	2
7374731	0.7	30	0.39	12	4
7370752	0.7	50	0.39	20	2
7374006	1.0	5	0.79	4	4
7371007	1.0	5	0.79	4	2
7374011	1.0	10	0.79	8	4
7371012	1.0	10	0.79	8	2
7374021	1.0	20	0.79	16	4
7371022	1.0	20	0.79	16	2
7374031	1.0	30	0.79	24	4
7371032	1.0	30	0.79	24	2
7374051	1.0	50	0.79	40	4
7371052	1.0	50	0.79	40	2
7371091	1.0	100	0.79	79	2
7371093	1.0	120	0.79	103	2
7374150	1.5	5	1.77	9	4
7371507	1.5	5	1.77	9	2
7374151	1.5	10	1.77	18	4
7371512	1.5	10	1.77	18	2
7374156	1.5	15	1.77	27	4
7371517	1.5	15	1.77	27	2
7374152	1.5	20	1.77	35	4
7371522	1.5	20	1.77	35	2
7374153	1.5	30	1.77	53	4
7371532	1.5	30	1.77	53	2
7374155	1.5	50	1.77	89	4
7371552	1.5	50	1.77	89	2
7371576	1.5	75	1.77	124	2
7371591	1.5	100	1.77	177	2
7371593	1.5	120	1.77	230	2
7371598	1.5	170	1.77	301	2
7374250	2.5	5	4.91	25	4
7372507	2.5	5	4.91	25	2
7374251	2.5	10	4.91	49	4
7372512	2.5	10	4.91	49	2
7374252	2.5	20	4.91	98	4
7372522	2.5	20	4.91	98	2
7374253	2.5	30	4.91	147	4
7372532	2.5	30	4.91	147	2
7372551	2.5	50	4.91	246	2

continues

Ordering Information

Catalog #	ID, cm	Length, cm	Cross-Sectional Area, cm ²	Maximum Volume, ml	Columns/Pkg
7372576	2.5	75	4.91	344	2
7372591	2.5	100	4.91	491	2
7372593	2.5	120	4.91	589	2
7375011	5.0	10	19.63	196	1
7375021	5.0	20	19.63	393	1
7375031	5.0	30	19.63	589	1
7375051	5.0	50	19.63	982	1
7375071	5.0	70	19.63	1,374	1

Catalog # Description

Econo-Column Selection Packs

7376601 **Econo-Column Selection Pack A**, includes 7 columns, 1 each of 0.7 x 10, 20, and 30 cm; 1.5 x 30 and 50 cm; 2.5 x 20 and 50 cm

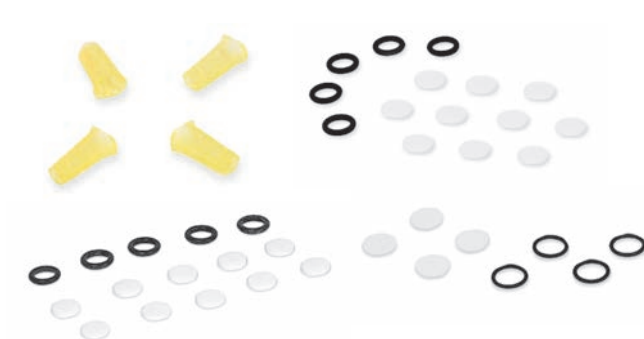
7376607 **Econo-Column Selection Pack B**, includes 6 columns, 1 each of 1.0 x 20, 30, and 50 cm; 1.5 x 20, 30, and 50 cm

For fittings, see low-pressure fittings on page 169.

Econo-Column Flow Adaptors

Flow adaptors significantly improve column performance by eliminating head space above the gel bed and by protecting the column bed from disruption during sample loading. Flow adaptors improve resolution by delivering buffer and sample directly to the top of the column bed. Flow adaptors are recommended for use with any low-pressure column connected to pumps, the BioLogicLP system, or other low-pressure systems.

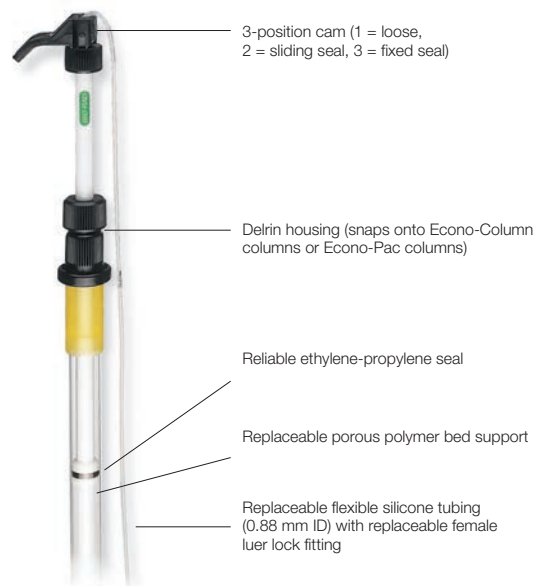
Econo-Column flow adaptors are available for 1.0, 1.5, 2.5, and 5.0 cm ID Econo-Column chromatography columns (pages 142–144) and Econo-Pac columns (page 141). Due to wear and tear of bed supports and O-rings, maintenance kits are available for standard upkeep of flow adaptors.



For More Information

Web: bio-rad.com/econocolumnaccessories

Download bulletin: 2289



Ordering Information

Catalog # Description

Flow Adaptors

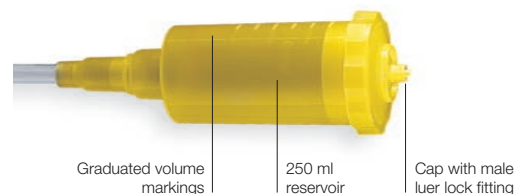
7380014	Flow Adaptor , 1.0 cm column ID, 1–7 cm functional length
7380015	Flow Adaptor , 1.0 cm column ID, 1–14 cm functional length
7380016	Flow Adaptor , 1.5 cm column ID, 1–14 cm functional length
7380017	Flow Adaptor , 2.5 cm column ID, 1–14 cm functional length
7380018	Flow Adaptor , 5.0 cm column ID, 1–14 cm functional length (does not include cam mechanism)
7380019	Econo-Pac Flow Adaptor , 1.5 cm column ID

Flow Adaptor Maintenance Kits

7380022	Flow Adaptor Maintenance Kit , for 5.0 cm flow adaptor, includes 2 bed supports and 2 O-rings
7380024	Flow Adaptor Maintenance Kit , for 1.0 cm adaptor with cam mechanism, includes 10 bed supports and 5 O-rings
7380025	Flow Adaptor Maintenance Kit , for 1.5 cm adaptor with cam mechanism, includes 10 bed supports and 5 O-rings
7380027	Flow Adaptor Maintenance Kit , for 2.5 cm adaptor with cam mechanism, includes 10 bed supports and 5 O-rings

Econo-Column Funnel

The Econo-Column funnel, constructed of durable polypropylene, is ideal for packing columns, loading diluted samples, or delivering large volumes of buffer. It forms a tight seal with Econo-Column chromatography columns up to 2.5 cm ID (pages 142–144), Poly-Prep columns (pages 141–142), and Econo-Pac columns (page 141).



Ordering Information

Catalog #	Description
7310003	Econo-Column Funnels , 250 ml, 5

Glass Econo-Column Reservoirs

Reservoirs are available in 500 ml and 1 L capacities and will fit 0.5, 0.7, 1.0, or 1.5 cm ID Econo-Column chromatography columns. To make a constant-pressure reservoir, close the reservoir top with a stopper that contains a piece of glass tubing extending into the reservoir. The removable upper cap has a male luer lock fitting.



Ordering Information

Catalog #	Description
7379112	Econo-Column Reservoir , 500 ml
7379113	Econo-Column Reservoir , 1 L

Bio-Scale MT High-Resolution Columns

Bio-Scale MT empty columns can be packed with the resin of your choice. These columns provide extremely high resolution in most chromatography applications. Bio-Scale MT columns allow precise sample application and provide the low dead volume required for high-resolution separations. The four column sizes (2, 5, 10, and 20 ml) allow easy scale-up of separation and purification protocols. The optimized design allows easy packing, bed height adjustment, sample application, and equilibration. Bio-Scale MT columns are convenient for use with BioLogic systems or any medium- or high-pressure chromatography system.

For More Information
 Web: bio-rad.com/MTcolumns
 Download bulletin: 1970



See Also

Bio-Scale CHT Type I columns: page 136.
 UNO columns: page 136.
 Bio-Scale Mini cartridges: page 132.
 NGC systems: page 148.
 ENrich columns: page 125.

Ordering Information

Catalog #	Description	Column Volume, ml	Pressure Limit, psi
Bio-Scale Columns*			
7510081	Bio-Scale MT2 Column , 7 x 52 mm	1.9–2.3	1,000
7510083	Bio-Scale MT5 Column , 10 x 64 mm	4.6–5.7	750
7510085	Bio-Scale MT10 Column , 12 x 88 mm	9.5–11.3	600
7510087	Bio-Scale MT20 Column , 15 x 113 mm	19.4–21.9	500

Catalog # Description

Cartridge Holders and Accessories

7510091	Bio-Scale 2 Replacement Parts Kit , includes 5 frits, 5 distribution screens, 2 O-rings, 1 frit remover
7510093	Bio-Scale 5 Replacement Parts Kit
7510095	Bio-Scale 10 Replacement Parts Kit
7510097	Bio-Scale 20 Replacement Parts Kit
7500554	1/16" OD (1.6 mm) Post-Pump Fittings , includes Delrin nut, ferrules, lock ring, 10 sets
7500567	UNO M6 Fittings Kit , includes 2 nuts and 4 ferrules to connect UNO column to an FPLC system
7500568	UNO 10-32 Fittings Kit , includes 2 nuts and 4 ferrules to connect UNO column to an HPLC system, for use with BioLogic DuoFlow and NGC systems

* Each Bio-Scale MT column comes with a Bio-Scale replacement parts kit.

Medium-Pressure Chromatography Systems

See Also

Multi-D chromatography applications: page 150.

NGC Medium-Pressure Chromatography Systems

The NGC family of medium pressure preparative chromatography systems offers a single laboratory chromatography solution that aligns and scales to fit your purification, automation, and throughput requirements. NGC laboratory scale chromatography systems provide you with a fully customizable and truly modular platform that can be designed to your current purification needs and is upgradable to meet future throughput and automation requirements.

For More Information

Web: bio-rad.com/NGCsystems

Please contact your local Sales Representative for more details.

Learn More about the Technology

Web: bio-rad.com/tech/chrom



NGC Quest and NGC Scout Series

NGC Discover Series

NGC Discover Pro Series

NGC chromatography system platforms — modular, customizable, and upgradable systems that adapt and expand to your throughput and application needs. All NGC systems are compatible with the NGC fraction collector and BioFrac fraction collector.



NGC Fraction Collector
(see page 161)



BioFrac Fraction Collector
(see page 163)

Medium-Pressure Chromatography Systems

bio-rad.com/NGCsystems

NGC Chromatography Systems Selection Guide

Product	Catalog #	NGC Quest 10 7880001	NGC Quest 10 Plus 7880003	NGC Quest 100 7880002	NGC Quest 100 Plus 7880004	NGC Scout 10 7880005	NGC Scout 10 Plus 7880007	NGC Scout 100 7880006	NGC Scout 100 Plus 7880008	NGC Discover 10 7880009	NGC Discover 100 7880010	NGC Discover Pro 10 7880011	NGC Discover Pro 100 7880012
NGC F10 pump module	7884002	•	•			•	•			•		•	
NGC F100 pump module	7884003			•	•			•	•				•
NGC mixer module	7884018	•	•	•	•	•	•	•	•	•	•	•	•
NGC sample inject valve module	7884007	•	•	•	•	•	•	•	•	•	•	•	•
NGC single-wavelength detector module	7884008	•		•		•		•					
NGC multi-wavelength detector module	7884009		•		•		•		•	•	•	•	•
NGC buffer blending valve module	7884010					•	•	•	•	•	•	•	•
NGC pH valve module (includes pH probe)	7884011					•	•	•	•	•	•	•	•
NGC sample pump module	7884004								•	•	•	•	•
NGC inlet valve module	7884006								•	•	•	•	•
NGC outlet valve module	7884013											•	•
NGC column switching valve module, 10 ml	7884012									•		•	
NGC column switching valve module, 100 ml	7884026									•	•	•	•
ChromLab software	7886000	•	•	•	•	•	•	•	•	•	•	•	•
NGC chromatography system and ChromLab software documentation	7886500	•	•	•	•	•	•	•	•	•	•	•	•

Note: All NGC systems include a touch screen and conductivity monitor and are compatible with the NGC fraction collector and BioFrac fraction collector.

Features and Benefits

Flexible, customizable chromatography systems to suit both your application and research needs.

- Adjustable and scalable platform adapts to individual application, workflow, and throughput requirements
- Plug-and-play modules enable a modular, customizable system that adapts to changing needs over time
- ChromLab software provides powerful, graphical instrument control, streamlined method development, and intuitive data analysis
- Graphical fluidics scheme selector matches the flow path to applications-based system setup
- Point-to-Plumb feature lighting provides step-by-step LED guided setup for easy system plumbing
- Real-time active flow path display for clear visualization of buffer, sample, and valve position and easy identification of system status
- Real-time module status displays offer immediate system diagnostics
- Pre-plumbed systems with QC-validated performance support more reproducible results and sharper peaks (included with all preconfigured NGC Quest, NGC Scout, and NGC Discover systems)

- Tier-Rotate system design enables optimal placement of valves and detectors to minimize hold-up volume
- Open platform is compatible with all medium-pressure chromatography columns and resins
- Compatibility of NGC and BioFrac fraction collectors allows for collection from analytical to preparative scale purifications
- Compact footprint fits on lab bench, in deli-fridge, or in coldroom

For more information about these features and benefits, please contact your local sales representative. Take a tour of the system at bio-rad.com/NGCsystems.

Applications and Uses of Medium-Pressure Chromatography Systems

Preparative to analytical scale isolation, purification, and analysis of multiple types of molecules, including:

- Recombinant protein purification and refolding
- Monoclonal antibody purification
- Virus removal preparations
- Analysis of plasma proteins for disease diagnosis
- Nucleic acid purifications

NGC Systems

Preconfigured NGC systems are designed with increasing automation and throughput in mind. All NGC systems include either a 10 or a 100 ml/min automated dual gradient pump, a mixer module, a sample injection valve module, and a detector with a conductivity monitor. Each preconfigured system can be further customized with additional modules to meet your specific purification needs.

NGC Quest and NGC Quest Plus

NGC Quest systems are designed for the all-purpose purification of proteins with automated pumps that provide accurate gradients for high-resolution separations. These systems support automated sample injection using fixed or dynamic sample loops.

NGC Quest 10 and Quest 100 systems feature:

- LED-based single-wavelength light source for the detection of proteins or nucleic acids (280 or 255 nm) with high-sensitivity conductivity measurements for accurate salt gradient formation

NGC Quest 10 Plus and Quest 100 Plus systems feature:

- Multi-wavelength (4) detector for simultaneous detection (190 to 800 nm) of proteins, peptides, nucleic acids, chromophores, and other biomolecular complexes with high-sensitivity conductivity measurements for accurate salt gradient formation

NGC Scout and NGC Scout Plus

NGC Scout systems are designed for method optimization with automated pumps and valves that provide accurate gradients and pH for high-resolution separations suitable for any application.

All NGC Scout 10 and Scout 100 systems include:

- All features of NGC Quest systems
- Buffer blending to automate buffer titrations for rapid scouting of pH parameters
- Compatibility for gradient separations at different pH values for rapid method development

The NGC Scout 10 and 100 systems feature:

- Single-wavelength UV (255 or 280) and conductivity detector

NGC Scout 10 Plus and Scout 100 Plus systems feature:

- Multi-wavelength (4) UV/Vis and conductivity detector

NGC Discover and Discover Pro

Both the NGC Discover and NGC Discover Pro chromatography systems are designed for higher throughput applications with rapid, robust automation for those who need to do method development.

NGC Discover 10 and 100 systems include the capabilities of the NGC Scout 10 and 100 Plus instruments but also comprise:

- A 100 ml/min integrated sample pump — supports contamination-free automated large-volume sample application
- Inlet valves — enable automated switching between buffers and samples, accelerating method development. NGC supports up to 2 inlet valves for buffers and 2 inlet valves for samples
- A column switching valve — facilitates automated column/resin scouting up to 5 columns without the need to replumb. NGC supports up to 3 column switching valves
- A sample outlet valve, a standard feature with the NGC Discover Pro systems — allows collection of up to 12 large-volume fractions and enables automated Multi-D chromatography applications. NGC supports up to 2 outlet valves

 [Learn More about Multi-D Chromatography](https://www.bio-rad.com/Multi-D)
Web: [bio-rad.com/Multi-D](https://www.bio-rad.com/Multi-D)

Ordering Information

Catalog # Description

NGC Medium-Pressure Chromatography Systems*

7880001	NGC Quest 10 Chromatography System , includes automated 10 ml/min pumps, single-wavelength (UV) and conductivity detection, accurate gradients, and sample injection
7880003	NGC Quest 10 Plus Chromatography System , includes automated 10 ml/min pumps, multi-wavelength (UV/Vis) and conductivity detection, accurate gradients, and sample injection
7880002	NGC Quest 100 Chromatography System , includes automated 100 ml/min pumps, single-wavelength (UV) and conductivity detection, accurate gradients, and sample injection
7880004	NGC Quest 100 Plus Chromatography System , includes automated 100 ml/min pumps, multi-wavelength (UV/Vis) and conductivity detection, accurate gradients, and sample injection
7880005	NGC Scout 10 Chromatography System , includes NGC Quest 10 capability, automated 10 ml/min pumps, pH valve and buffer blending valve for automated gradient and buffer blending
7880007	NGC Scout 10 Plus Chromatography System , includes NGC Quest 10 Plus capability, automated 10 ml/min pumps, pH valve and buffer blending valve for automated gradient and buffer blending
7880006	NGC Scout 100 Chromatography System , includes NGC Quest 100 capability, automated 100 ml/min pumps, pH valve and buffer blending valve for automated gradient and buffer blending
7880008	NGC Scout 100 Plus Chromatography System , includes NGC Quest 100 Plus capability, automated 100 ml/min pumps, pH valve and buffer blending valve for automated gradient and buffer blending
7880009	NGC Discover 10 Chromatography System , includes NGC Scout 10 Plus capability, automated 10 ml/min pumps, sample pump for large sample injection, column switching valve (up to 5 columns), and buffer inlet valve
7880010	NGC Discover 100 Chromatography System , includes NGC Scout 100 Plus capability, automated 100 ml/min pumps, sample pump for large sample injection, column switching valve (up to 5 columns), and buffer inlet valve
7880011	NGC Discover Pro 10 Chromatography System , includes NGC Scout 10 Plus capability, automated 10 ml/min pumps, sample pump for large sample injection, sample inlet valve, column switching valve (up to 5 columns), 2 buffer inlet valves, and outlet valve
7880012	NGC Discover Pro 100 Chromatography System , includes NGC Scout 100 Plus capability, automated 100 ml/min pumps, sample pump for large sample injection, sample inlet valve, column switching valve (up to 5 columns), 2 buffer inlet valves, and outlet valve

* All NGC systems include ChromLab software.

Multi-D Chromatography

12001088 NGC Multi-D Chromatography Starter Kit

Module Overview

The NGC family of medium-pressure chromatography systems offers flexible system configurations that enable upgrades and reconfiguration of the modules to fit multi-user needs, applications, and laboratory space requirements. All NGC systems can be individually customized using NGC plug-and-play modules that are user installable. Systems can be easily reconfigured and seamlessly upgraded with increased functionality such as higher flow rates (10 ml/min or 100 ml/min), sophisticated detection capabilities, pH monitoring, automated buffer selection, multicolumn connection, and buffer blending.

NGC Buffer Blending Valve Module

The NGC buffer blending valve is used for automatic online buffer preparation and generation of pH gradients for quick pH scouting. When used in conjunction with the dual gradient pump system, the buffer blending valve enables automated elution gradients and highly accurate buffer blending for rapid scouting and method development. The valve can also double the flow rate of a salt gradient on an F10 pump and F100 pump.



NGC Buffer Blending Valve Module

NGC Inlet Valve Module

The NGC inlet valve module allows for automatic buffer and sample selection during method running. It speeds up method development by allowing for automatic selection of up to seven buffers and a cleaning solution per valve. It also works as a mini autosampler for injecting multiple large-volume samples via the sample pump.



NGC Inlet Valve Module

NGC F10 and F100 System Pump Modules

The F10 and F100 pumps produce buffer gradient solutions. Flow rates on all pumps can be automatically controlled to avoid overpressure. NGC instruments can have up to three high-precision pumps: two system gradient pumps (Pump A and Pump B) and one sample pump.

NGC Sample Pump 100 Module

The NGC sample pump 100 module enables both the injection of large sample volumes and accurate and consistent multiple loadings from a single sample stock. This dedicated pump eliminates the risk of contaminating system pumps, allowing for automated loading of large sample volumes directly to the column. The sample pump also includes an integrated pressure sensor that protects the column and resin from overpressure.

NGC Sample Inject Valve Module

The NGC sample inject valve enables the system to load a specific predetermined volume of sample onto a column with a maximum operating pressure of 3,650 psi. It is also compatible with capillary loops and sample pumps, eliminating the need to replumb.

NGC Single-/Multi-Wavelength Detector Modules

The NGC single UV and multi UV/Vis detector modules are combined with an integrated conductivity monitor to measure buffer conductivity or salt gradients.

The single-wavelength UV detector contains an LED UV lamp and monitors UV absorbance of proteins or nucleic acids at 280 or 255 nm, one wavelength at a time.

The multi-wavelength UV/Vis detector adds flexibility to the chromatography system, enabling the simultaneous monitoring of four wavelengths (UV and Vis) for greater sensitivity and detection of proteins, peptides, nucleic acids, and chromophores such as hemoglobin.

NGC Outlet Valve Module

Use the NGC outlet valve either as a stand-alone unit or in conjunction with the BioFrac fraction collector (#7410002).

As a single, stand-alone unit, the outlet valve is capable of collecting up to 12 large-volume fractions such as flowthrough or waste. Two outlet valves may be daisy-chained to collect up to 23 large-volume fractions, including waste.

When a BioFrac fraction collector is connected, the collection sequence can be programmed to collect smaller-volume fractions in the BioFrac fraction collector and larger-volume fractions via the outlet valves, providing full flexibility.

The outlet valve also enables automated tandem/2-D and Multi-D chromatography applications by directing peaks of interest onto the next column.



NGC Sample Pump Module

Specifications for System and Sample Pump Modules

F10 Pump

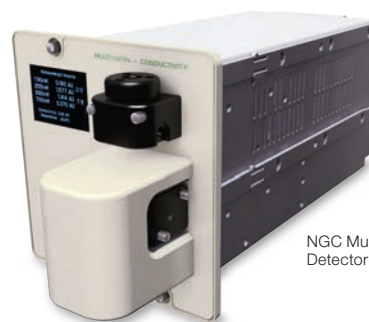
Flow rates	0.001–10 ml/min (normal range); 0.002–20 ml/min (column packing flow)
Max pressure limit	3,650 psi (252 bar, 25.2 MPa)

F100 Pump

Flow rate setting	0.01–100 ml/min (normal range); 0.02–200 ml/min (column packing flow)
Max pressure limit	1,450 psi (100 bar, 10 MPa)

Sample Pump 100

Flow rate	Up to 100 ml/min
Max pressure limit	1,450 psi (100 bar, 10 MPa)



NGC Multi-Wavelength Detector Module

Specifications for Single-/Multi-Wavelength Detector Modules

UV Monitor

Single-wavelength range	255 or 280 nm
Multi-wavelength (up to 4) range	190–800 nm

Conductivity Monitor

Conductivity range	0.01–999.99 mS/cm
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Features and benefits of the NGC outlet valve module include:

- Collect up to 12 large-volume fractions with a single valve
- Collect up to 23 large-volume fractions with two valves
- Collect variable fraction sizes with the BioFrac fraction collector
- Automate multistep purifications

NGC pH Valve Module

The NGC pH valve module includes a pH electrode for accurate pH monitoring during the run (1–14). The valve is capable of directing flow to the pH electrode or bypassing the probe automatically. The valve includes an integrated calibration port, which can be used to calibrate the probe without disconnecting the probe from the system.

For sensitive applications, the software is capable of calculating and displaying temperature-compensated pH values for accuracy and ease of use.

NGC Mixer Module

The NGC mixer module homogenizes buffers from two system pumps (Pumps A and B). In addition to the mixer motor assembly, the module includes an integrated system pressure sensor. It can accommodate both F10 mixers (263 μ l and 750 μ l) and F100 mixers (2, 5, and 12 ml). The mixer volume can be adjusted, depending on flow rate, to achieve optimal buffer homogenization by inserting the appropriate size barrels.

NGC Air Sensor Module

The NGC air sensor module enables detection of the end of buffer and sample, thereby protecting against air entering the system and damaging pumps or columns. The module supports up to four air sensors (large- and small-bore). Each NGC air sensor extension module can be used in conjunction with the air sensor module to enable four additional air sensors (totaling up to eight).

NGC Column Switching Valve Module

The NGC column switching valve allows connection of up to five columns, enabling quick and easy column scouting without replumbing. With an internal bypass mode this valve lets buffers bypass the connected columns when priming or cleaning the system. The valve can also reverse the flow, which is ideal for column cleaning and applications that require narrow band elution.

The column switching valve has integrated pressure sensors that measure pre- and delta-column pressures. This protects the column and resin from overpressure by triggering the pumps to slow down or stop. The column switching valve can also be used to connect sample loops in multistep purifications.



NGC pH Valve Module



NGC Air Sensor Module

Signal Import Module

Adding external devices to a purification workflow provides the flexibility to increase automation and the amount of information collected. The NGC signal import module (SIM) enables analog to digital signal conversion and connection to third-party devices such as external detectors or autosamplers.

NGC Accessories

NGC Fraction Collector

The NGC fraction collector's flexibility and versatility improves high-throughput purification workflows. It can collect into multiple vessel types within a method and has increased capacity in comparison to the BioFrac fraction collector. The NGC chromatography system paired with the NGC fraction collector provides collection options for analytical to preparative chromatography applications and is well suited to meet the purification needs of industry laboratories. Please refer to page 161 for detailed product information.

BioFrac Fraction Collector

The BioFrac fraction collector is compatible with all NGC chromatography systems. It is ideal for analytical to preparative scale chromatography applications. Please refer to page 163 for detailed product information.

Ordering Information

Catalog # Description

NGC Medium-Pressure Chromatography System Modules and Accessories

System Pumps

- 7884002 **NGC F10 Pump Module**, includes 10 ml/min system pump kit for creating buffer gradients; can be used in conjunction with buffer blending valve to generate flow rates up to 20 ml/min; kit includes necessary tubing and fittings
- 7884003 **NGC F100 Pump Module**, includes 100 ml/min system pump kit for creating buffer gradients; can be used in conjunction with buffer blending valve to generate flow rates up to 200 ml/min; kit includes necessary tubing and fittings

Sample Pump

- 7884004 **NGC Sample Pump 100 Module**, includes 100 ml/min sample pump kit for automated large-volume sample application via the sample inject valve; kit includes necessary tubing and fittings

Detectors

- 7884008 **NGC Single-Wavelength Detector Module**, for detection of nucleotides and proteins at 255 or 280 nm and generation of salt gradients; UV/conductivity detector kit includes necessary tubing and fittings
- 7884009 **NGC Multi-Wavelength Detector Module**, for simultaneous wavelength (4) monitoring of elution fractions 190–800 nm and generation of salt gradients; UV/Vis, conductivity detector kit includes necessary tubing and fittings
- 7885024 **NGC UV Flow Cell, 5 mm**, UV flow cell, standard with all systems. Fits single-wavelength UV and multi-wavelength UV/Vis detectors in both F10 and F100 systems
- 7885023 **NGC UV Flow Cell, 10 mm**, analytical UV flow cell. Fits single-wavelength UV and multi-wavelength UV/Vis detectors in F10 systems. Ideal for use at lower flow rates
- 7885022 **NGC UV Flow Cell, 2 mm**, preparative UV flow cell. Fits single-wavelength UV and multi-wavelength UV/Vis detectors in F100 systems. Ideal for use at high flow rates
- 7500230 **Backpressure Regulator**, 40 psi, restricts flow and creates appropriate backpressure to prevent bubble spiking in UV detectors

Detector Lamp Replacements

- 7885000 **NGC LED Lamp Replacement**, includes 255/280 nm LED lamp replacement for single-wavelength detectors
- 7885001 **NGC Deuterium Lamp Replacement**, includes deuterium lamp replacement (UV) for multi-wavelength detectors
- 7885002 **NGC Tungsten Lamp Replacement**, includes tungsten lamp replacement (Vis) for multi-wavelength detectors
- 7885056 **NGC Replacement Conductivity Monitor**, includes replacement conductivity monitor

pH Valve

- 7884011 **NGC pH Valve Module**, for accurate inline pH measurement; includes pH probe, tubing, and fittings
- 7885026 **NGC pH Probe (Ag/AgCl)**, for use with the pH valve for accurate pH monitoring (pH 0–14) during purifications
- 7885027 **NGC Blank pH Probe**, pH valve cap for use with the pH valve when the probe is removed

Mixer

- 7884018 **NGC Mixer Module**, for use with all NGC systems; additional mixer base or barrels (ordered separately) can be extended with 2, 5, and 12 ml barrels for efficient gradient mixing at higher flow rates
- 7884019 **NGC F100 Mixer**, 750 µl base and top assembly, included with all 100 ml/min NGC systems
- 7884020 **NGC F10 Mixer**, 263 µl base and top assembly, included with all 10 ml/min NGC systems
- 7884021 **NGC F10 Mixer Barrel Kit**, 750 µl extension barrel for F10 263 µl mixer (part of Scout 10 and Discover 10 series)
- 7884022 **NGC F10 Mixer Barrel Kit**, 2 ml extension barrel for F10 263 µl mixer (optional)
- 7884028 **NGC F100 Mixer Barrel Kit**, 2 ml extension barrel for F100 750 µl mixer body, part of Scout 100, Discover 100 series
- 7884023 **NGC F100 Mixer Barrel Kit**, 5 ml extension barrel for F100 750 µl mixer (optional)
- 7884024 **NGC F100 Mixer Barrel Kit**, 12 ml extension barrel for F100 750 µl mixer (optional)

Valves

- 7884006 **NGC Inlet Valve Module**, for automated switching between multiple buffers and samples during methods, kit includes the necessary tubing and fittings
- 7884007 **NGC Sample Inject Valve Module**, for manual sample application of small-volume samples via sample loops or large volume samples using a sample pump; kit includes necessary tubing, fittings, and sample injection port; valve can also be used with DynaLoops and sample pumps
- 7884010 **NGC Buffer Blending Valve Module**, for online buffer preparation and generating pH gradients for quick pH scouting; kit includes the necessary tubing and fittings; can also double system pump flow rate
- 7884012 **NGC Column Switching Valve Module**, 10 ml, for use with F10 systems and multiple columns for quick column scouting and reverse flow, holds 5 columns; kit includes the necessary tubing and fittings to accommodate the most common column types
- 7884013 **NGC Outlet Valve Module**, for collection of up to 12 large-volume fractions, including necessary tubing and fittings
- 7884026 **NGC Column Switching Valve Module**, 100 ml, for use with F100 systems and multiple columns for quick column scouting and reverse flow, holds 5 columns; kit includes the necessary tubing and fittings to accommodate the most common column types

continues

Medium-Pressure Chromatography Systems

bio-rad.com/NGCmodules

Ordering Information

Catalog # Description

Maintenance Kits

7885003	Pump Maintenance Kit , 10 ml, for regular maintenance of NGC F10 pumps, includes seals and check valves
7885004	Pump Maintenance Kit , 100 ml, for regular maintenance of NGC F100 pumps, includes seals and check valves
7885005	Pump Maintenance Kit, Sample pump , 100 ml, for regular maintenance of NGC sample pump, includes seals and check valves

Air Sensor

7885017	NGC Air Sensor Module , for detection of end of buffer and sample, protects against air entering pumps and columns, supports up to 4 air sensors (large- and small-bore); kit includes 2 large-bore air sensors
7885018	NGC Air Sensor Extension Module , connects to the base air sensor module to support 4 additional air sensors (optional, does not include any air sensors)
7885020	NGC Air Sensor , small, includes air sensor; enables exclusion of air from system and columns. Detects air in small-diameter PEEK tubing
7885021	NGC Air Sensor , large, includes air sensor; enables exclusion of air from system and columns. Detects air in large-diameter PTFE tubing

Fraction Collectors

17002070	NGC Fraction Collector , 100/240 V, includes two 13 mm racks, tubing kit, external power supply, and USB cable
7410002	BioFrac Fraction Collector , 100/240 V, fraction collector compatible with all NGC systems, includes power cord, rack set F1 (2 x flatpack, 13 mm), BioFrac diverter valve, fittings kit
7884025	NGC Communication Adaptor , enables communication between Bio-Rad devices such as the BioFrac fraction collector and the NGC system
7884016	NGC Signal Import Module , enables analog to digital signal conversion and connection to devices such as third-party autosamplers and external detectors, includes cable for connecting to NGC system (#7885013) and external detectors

NGC Accessories

7885038	NGC Column Holder , column holder for use with NGC systems, pkg of 1
7885039	NGC Cartridge Holder , universal cartridge holder, holds 1–10 ml cartridges
7885041	NGC Sample/Wash Tube Holder , holds two 50 ml Falcon tubes, for use with NGC systems (tubes not included)
7885042	NGC Tubing Retainers (small) , holds small PEEK tubing in an organized manner, pkg of 3 magnetic retainers
7885035	NGC Tubing Retainers (large) , holds larger PTFE tubing in an organized manner, pkg of 3 magnetic retainers
7885031	NGC Inline Filter Kit , includes buffer inline filter kit, filters particulates from buffer and prevents clogging of columns
7884017	NGC Fittings Kit , includes PEEK and Tefzel nuts, ferrules, unions, plugs, tubing cutter, fittings tightener, and luer syringe, for use with NGC systems
7500230	40 psi Backpressure Regulator

Single-Injection Sample Loops, Kits, and Accessories

7500471	Sample Injection Port , for use with AVR7-3 automated sample injection valve
1250224	Injection Needle , 22 gauge, blunt
7500490	Small-Volume Sample Loop Kit , includes 100, 250, and 500 µl PEEK loops
7500491	Large-Volume Sample Loop Kit , includes 1, 2, and 5 ml PEEK loops
7500482	25 µl Tefzel Sample Loop
7500483	50 µl Tefzel Sample Loop
7500492	100 µl PEEK Sample Loop
7500493	250 µl PEEK Sample Loop
7500494	500 µl PEEK Sample Loop
7500495	1 ml PEEK Sample Loop
7500496	2 ml PEEK Sample Loop
7500497	5 ml PEEK Sample Loop

Dynamic (Sliding Piston) Sample Loops, Kits, and Seal Replacement

7500451	DynaLoop 25 Kit , includes 25 ml DynaLoop sliding piston loop, DynaLoop parts kit
7500452	DynaLoop 90 Kit , includes 90 ml DynaLoop sliding piston loop, DynaLoop parts kit
7500450	DynaLoop Parts Kit , includes 4 end cap O-rings, 1 sliding seal O-ring, 1 filter, 4 nut fittings, four 1/8" ferrules, five 1/4–28 nuts and ferrules, 10' of 1/8" tubing
7500475	DynaLoop 25 Sample Loop , 25 ml, replacement
7500476	DynaLoop 90 Sample Loop , 90 ml, replacement

continues

Ordering Information

Catalog # Description

Additional Options

7884000	NGC Expansion Bay , tier 3, expands base system to 3-tier system for use with additional modules
7884001	NGC Expansion Bay , tier 4, expands system to 4-tier system for use with additional modules
7885014	NGC Buffer Tray , holds up to 8 buffer bottles. Includes drain port to prevent flooding in the event of a leak
7885016	NGC Drip Tray , for use with NGC systems
7885040	NGC Touch Screen Stand , used to mount touch screen outside of coldbox or -room while tethered to the system, enables convenient system operation from the outside
7885060	Touch Screen Bracket , for use with standard third-party monitor stands, used to mount touch screen outside the coldroom or -box while tethered to the system, includes cable
7884015	Computer , for use with NGC systems, includes Intel Core i7 3.4 GHz (quad core), 4 GB RAM, 1 x 250 GB hard drive, CD/DVD drive, Microsoft Windows 7 Professional 64-bit edition
7884027	Monitor , for use with NGC system computer
7880020IQOQ	NGC IQ/OQ, NGC Quest/Quest Plus IQ/OQ (with BioFrac or NGC fraction collector and air sensor) , Installation Qualification and Operational Qualification (IQ/OQ) performed by field service engineers on location at the customer's site, duration: 1 day
7880030IQOQ	NGC Scout/Discover/Discover Pro IQ/OQ (with BioFrac or NGC fraction collector and air sensor) , Installation Qualification and Operational Qualification (IQ/OQ) performed by field service engineers on location at the customer's site, duration: 2–3 days

NGC ChromLab Software

ChromLab chromatography software is the integrated method development, data acquisition, and analysis software package for all NGC chromatography systems. It controls all functions for lab-scale protein purification including instrument control, method development, real-time monitoring, chromatogram comparison, and peak analysis.

This interface is also fully configured with VNC (virtual network computing), allowing you to control and monitor the system remotely from nearly any smartphone, tablet, or laptop.

ChromLab software is available in standard format or as a security edition, which provides the necessary features to permit users to operate in compliance with Title 21 of the U.S. Code of Federal Regulations Part 11 (21 CFR Part 11) within a closed system. It is compatible with Windows 7–10 64 bit.

ChromLab Software

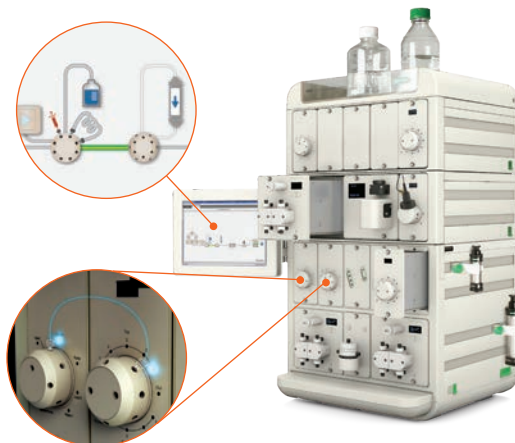
ChromLab is available in standard format. Upgrades, which are free to existing users, contain enhancements to existing ChromLab features and a linear flow rate calculator.

Graphical Instrument Setup and Control

ChromLab software instrument controls are designed around a novel fluidics scheme interface that can be customized to exact hardware configurations. ChromLab enables easy setup with its novel Point-to-Plumb feature. During manual data acquisition, each component of the fluidics scheme can be controlled to reach optimized conditions. In both manual and automated method-based runs, the software highlights the real-time fluidics path and module status to ensure accuracy.

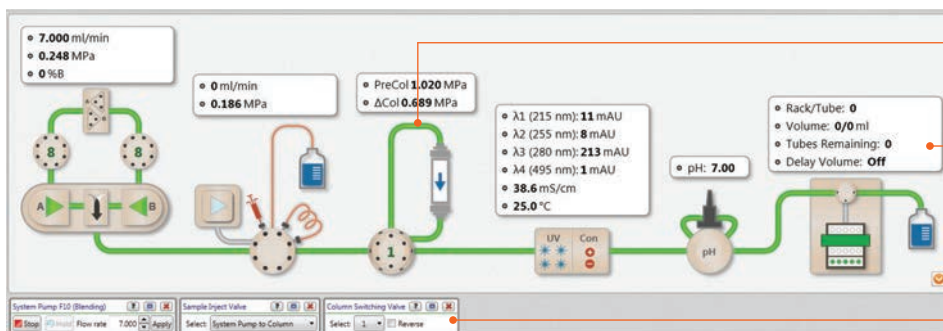
The instrument control interface is touch-screen optimized, allowing flexibility without the need for a computer adjacent to the system, thus minimizing the total footprint.

Fluidics Scheme



Click on each step in flow path for guided Point-to-Plumb LED system plumbing. Instrument LEDs blink at the next plumbing location.

Manual Instrument Control



Active flow path (green) clearly highlighted

Real-time status display of flow path devices

Graphical manual control panels allow complete, accessible manual control of the system

Complete system status and control is available via the graphical fluids scheme.

Streamlined Method Development

ChromLab software includes templates for common chromatographic techniques and a column database for maximum versatility. Select a column from the column database. The software automatically adjusts optimal flow rate and pressure parameters for the selected column.

Methods are created by drag-and-drop functional phases. Grouping parameters into intuitive phases puts the focus on separation workflow instead of hardware controls. The interactive gradient graph enables visualization of the protocol and quick click-and-drag experimental adjustments.

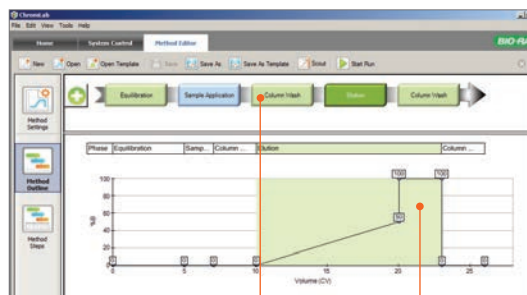
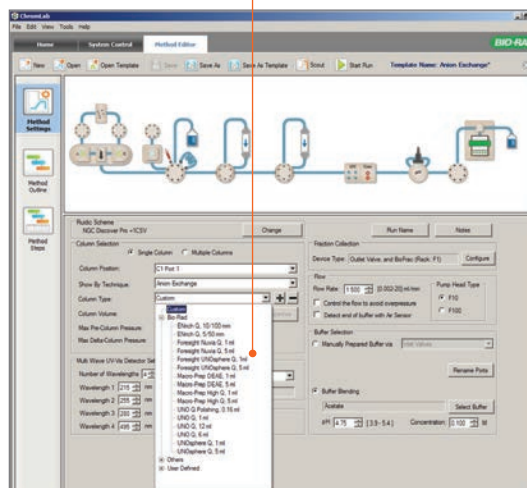
Automated Multi-D Purification Techniques

The software contains tandem and 2-D purification templates that reflect common automated multistep purification scenarios. These templates may be edited to fit your research and reduce hands-on time.

Features and Benefits of ChromLab Software

- Touch screen allows the same level of flexibility without the need for a computer adjacent to the system, minimizing the total footprint for an operational system
- Customizable chromatogram layouts with a variety of viewing and data analysis options
 - Enhances multi-user control with user-specific preferences for personalized analysis
 - Provides ultimate system control with the ability to edit on the fly and save as a new method during current run
- Rapid creation of trace comparisons for easy analysis across multiple purification runs
- Single-click peak detection and integration for quicker results
- Advanced integration parameters to enable manual integration functions and peak addition or removal for fine-tuning your data
- Intuitive, grouped data tabular layouts that organize data for easy navigation

Extensive column library selection and intuitive interface for custom self-packed columns



Phase-based method editing

Drag and adjust %B for quick adjustment to the gradient phase

Applications and Uses of ChromLab Software

- All functions of the NGC medium-pressure chromatography system are controlled for lab-scale protein purification
- Method development to identify best methods
- Real-time monitoring of proteins, peptides, nucleic acids, and chromophores
 - Provides collection flexibility with the option to collect each phase into different types of vessels
 - Enables customization of collection options based on detector signals, conductivity, pH, and %B
- Chromatogram comparison and peak analysis
- Advanced integration parameters enable manual integration functions and peak addition or removal for fine-tuning data

- Organized data and easy navigation with intuitive grouped table layouts
- Multi-instrument control
- Centralized database for easy data storage and sharing
- Fraction heat maps to help locate protein of interest
- Protein quantitation is calculated upon entering extinction coefficient

For More Information

Web: bio-rad.com/chromlab

 [Learn More about Multi-D Chromatography](#)
Web: bio-rad.com/Multi-D

Ordering Information

Catalog #	Description
12009390	ChromLab Software and Documentation USB , single software platform compatible with all NGC systems, includes integrated system setup controls, method development, and data acquisition and analysis. Compatible with Windows 7–10 64 bit

ChromLab Software, User Management Edition

ChromLab Software, User Management Edition enables multiple system control from a single PC and the ability to save all methods, runs, and analyses to a centralized database. User management enables assignment of user permissions to control read, write, and edit access to all data files.

- ChromLab administrator can designate a central computer as the host of a shared ChromLab database
- Data can be shared among ChromLab computers and NGC systems

Ordering Information

Catalog #	Description
17000099	ChromLab User Management License , 1 seat
17000098	ChromLab User Management License , 3 seats
17000097	ChromLab User Management License , 5 seats

Medium-Pressure Chromatography Systems

bio-rad.com/NGCaccessories

ChromLab Software, Security Edition

ChromLab, Security Edition is available with one, three, or five licenses. When enabled, Security Edition provides the necessary features to permit users to operate in compliance with Title 21 of the U.S. Code of Federal Regulations Part 11 (21 CFR Part 11) within a closed system.

ChromLab, Security Edition software provides tools to:

- Limit and authorize system access to authorized users
- Produce computer-generated audit trails
- Limit access to selected tasks through user level permissions
- Prevent falsification of data
- Generate binding signatures and records
- Create accurate and complete signed reports for FDA submissions

For More Information
Web: bio-rad.com/chromlab

Ordering Information

Catalog #	Description
7886001	ChromLab Security Edition (SE Software) USB , single software platform compatible with all NGC systems, includes integrated system setup controls, method development, data acquisition, and analysis. Security Edition also provides features in accordance with 21 CFR Part 11 requirements. 1 license
7886003	ChromLab Security Edition (SE Software) USB , 3 licenses
7886005	ChromLab Security Edition (SE Software) USB , 5 licenses

ChromLab Software, IQ/OQ

The NGC IQ/OQ is designed to evaluate the installation and operation of the instrument. This service is provided by our trained field service engineers utilizing the Installation Qualification and Operational Qualification protocols we have developed. Features and benefits of NGC installation and qualification and operational qualification:

- Enable U.S. FDA 21 CFR Part 11 compliance
- Ensure system performance
- Are performed by trained field service engineers
- Are performed at customer sites

For More Information
Web: bio-rad.com/NGCiqq

Ordering Information

Catalog #	Description
7880020IQOQ	NGC Quest/Quest Plus IQ/OQ (with fraction collector and air sensor) , Installation Qualification and Operational Qualification (IQ/OQ) performed by field service engineers on location at the customer's site, duration: 1 day
7880030IQOQ	NGC Scout/Discover/Discover Pro IQ/OQ (with fraction collector and air sensor) , duration: 2–3 days

Fraction Collectors

Model 2110 Fraction Collector

This easy-to-use fraction collector provides multiple collection modes for chromatographic separations. Key features include:

- Time or drop collection modes (or volume collection mode when connected to the Model EP-1 Econo pump or BioLogic LP system)
- Collection of 1 drop (~50 µl) to 9 ml fractions in 80 test tubes or microtubes (with optional adaptor)
- Small (Econo-Column) chromatography columns can be mounted to drop-forming arm to minimize dead volume
- Manual-advance tube changes
- Coldroom compatibility
- Small footprint of 24 x 33 cm
- Meets IEC 61010 and CSA 22.2 certification



For More Information

Web: bio-rad.com/model2110

Ordering Information

Catalog #	Description
7318122	Model 2110 Fraction Collector , 100/120 V
7318120	Model 2110 Fraction Collector , 220/240 V
Accessories	
7318130	Carousel , 80-tube capacity
7318135	Micro Tube Adaptor , 80 microtube capacity
7318136	Instrument Dust Cover
7318131	Replacement Drop Formers , 2
7318261*	System Cable 1 , 8-pin mini-DIN to DB-9 connector
7318265*	System Cable 5 , DB-9 connector to bare wires
7319010*	System Cable 22 , Y-cable connecting Econo gradient pump to Model 2110 fraction collector
Tubes	
2239750	Clear Polystyrene Tubes , 13 x 100 mm, 9 ml nominal capacity, 1,000
2239751	Natural Polypropylene Tubes , 13 x 100 mm, 9 ml nominal capacity, 1,000
2239500	Micro Test Tubes , capless, 1.5 ml, polypropylene, clear, graduated, 500

* For more information, refer to the Cable Guide on page 165.

NGC Fraction Collector

The NGC fraction collector's (NGC FC) flexibility and versatility improves high-throughput purification workflows. It can collect into multiple vessel types within a method and has increased capacity compared to the BioFrac fraction collector. The NGC chromatography system paired with the NGC fraction collector provides collection options for analytical to preparative chromatography applications and is well suited to meet the purification needs of industry laboratories.

Key features:

- Maximizes lab efficiency with automated collection into multiple vessel types within a method, from 96-well plates to 250 ml bottles
- Enables production batch capacity by collecting up to 80 unlimited volume fractions
- Has double or more the capacity of the BioFrac fraction collector
- Can connect 2 fraction collectors to the NGC chromatography system — 1 NGC FC with 1 BioFrac FC or 2 NGC FCs
- Maintains integrity of fractions with a benchtop Peltier cooling option
- Supports flow rates up to 200 ml/min
- Has a sturdy design with a new range of metal racks
- Comes factory calibrated so no need to calibrate for different rack types
- Has multitrigger collection: slope, pH, conductivity, etc
- Allows for faster downstream analysis with easy access to fractions during a run
- IEC/EN 61010, IEC/EN 61326, IEC/EN 61000, and CAN/CSA 22.2 certification

Optional Components

- Peltier cooling modules for 15 ml, 50 ml, and 96 deep well plates
- Enclosure maintains sample integrity without limiting access, protecting your samples from environmental conditions while allowing full sample access during a run
- Prep rack adaptor for limitless volume sample collection

For More Information

Web: bio-rad.com/NGCCollector
Request or download bulletin: 6963



NGC Fraction Collector



Versatile Rack Options



Power Supply and Peltier Cooling Modules

Capacity Comparison between the BioFrac and NGC Fraction Collectors

Cooling option	BioFrac Fraction Collector		NGC Fraction Collector	
	Tubes/Racks	Capacity	Tubes/Racks	Capacity
Ice bath			Peltier cooling racks	
Vessel Type Size	Tubes/Racks	Capacity	Tubes/Racks	Capacity
12–13 mm	90	180	96	384
15–16 mm	60	120	75	300
18–20 mm/15 ml	40	80	70	280
30 mm/50 ml	6	24	27	108
0.5 ml	63	252	—	—
1.5–2.0 ml microtubes	42	168	96	384
250 ml bottles	4	4	4	16
96-well plate	4	4	2	8
48-well plate	4	4	2	8
24-well plate	4	4	2	8
12-well plate	4	4	—	—
Prep-20 rack	20	20	20	40

NGC Fraction Collector Enclosure

Optional enclosure protects fractions from dust and particulates without restricting access to tubes and racks.

For More Information

Request or download bulletin: #10000062077 and 6963

- Unrestricted access to tubes and racks
- Protects fractions from dust and airborne particulates
- Lightweight design with access to fraction collector from front or sides

Ordering Information

Catalog #	Description
17002070	NGC Fraction Collector , 100/240 V, includes two 13 mm racks, tubing kit, external power supply, and USB cable
Accessories	
12009848	NGC Fraction Collector Enclosure
12003752	Rack for 13 mm Tubes , for 96 x 13 mm tubes
12003755	Rack for 16 mm Tubes , for 75 x 16 mm tubes
12003756	Rack for 18 mm/15 ml Tubes , for 75 x 18 mm tubes
12003757	Rack for 50 ml Tubes , for 27 x 29 mm tubes
12003754	Rack for Deep Well Microtiter Plate , for 2 x 24-, 48-, and 96-well plates
12003753	Rack for 1.5–2 ml Capless Microtubes , for 96 tubes
12003760	Plate Rack Riser
17002942	NGC Fraction Collector Rack Adaptor
12005823	Funnel Adaptors R/L Adaptor Kit
12005822	Dispense Tip Replacement Kit
12005799	Peltier Cooling Kit
12003748	Peltier Rack Power Supply , 4-channel power supply for up to 4 Peltier rack modules
12003749	Peltier Rack Module , 1 insulated rack per module
12003751	Insulated Rack for 15 ml Tubes , for 30 x 15 ml tubes
12003759	Insulated Rack for 50 ml Tubes , for 14 x 50 ml tubes
12003747	Peltier Rack Module Microtiter Plate Adaptor , for 2 deep well microtiter plates

BioFrac Fraction Collector

The easy-to-program BioFrac fraction collector can be used for basic or complex fraction collection schemes. Off-the-shelf racks extend the versatility of collection schemes and provide cost-effective storage of samples. Off-the-shelf racks are autoclavable, easy to assemble, and lie flat, using little storage space

Key features include:

- Collection in time or drop mode (or volume mode when connected to an NGC or BioLogic LP chromatography system)
- Collection of peaks by peak detection, time windows (up to 20), or a combination of both
- Drop arm movement in column, row, or serpentine pattern movements for microplates or Titer tube tubes
- A dispenser arm that is manually adjustable to tube heights ≤ 150 mm
- Numerous off-the-shelf racks to accommodate tubes (12–20 mm diameter), Eppendorf or other microtubes (0.5, 1.5, or 2.0 ml), or scintillation vials
- Multirun feature that allows overlay of fractions
- IEC 6101A 22.2 certification

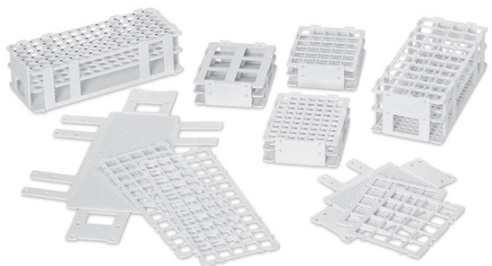
Optional Components

- BioFrac ice bath/microplate rack with tube grips that can hold 13 mm tubes
- BioFrac prep-20 preparative rack with up to 20 collection ports for collection from bottles to carboys
- Microplate drophead kit for precise collection of small volumes into microplates

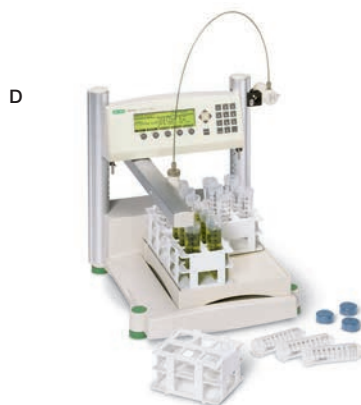
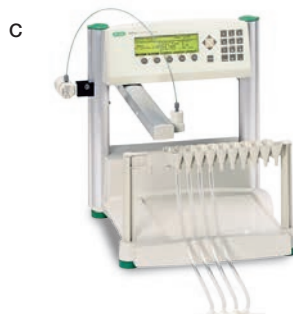
For More Information

Web: bio-rad.com/biofrac

Request or download bulletin: 2711



Flexible rack options. The ice bath/microplate rack is used to collect fractions in chilled test tubes (A) or up to four microplates (B) (shown using the optional 25 μ l drophead). The prep adaptor rack (C) is used for preparative fractionation into 1–20 collection vessels of any size. The BioFrac fraction collector holds up to four H4-high racks (D). The BioFrac fraction collector accepts a variety of off-the-shelf racks.



Medium-Pressure Chromatography Systems

Fraction Collectors

bio-rad.com/fractioncollectors

Ordering Information

Catalog #	Description
7410002	BioFrac Fraction Collector , input voltage 100/240 V, includes power cord, rack set F1 (2 x flatpack, 13 mm), BioFrac diverter valve, fittings kit

Accessories

7410010	Rack Set F1 , 2 x flatpack, with numbered tube positions, each holds 90 tubes, 12–13 mm diameter
7410011	Rack Set F2 , 2 x flatpack, each holds 60 tubes, 15–16 mm diameter, for total of up to 120-tube collection
7410012	Rack Set F3 , 2 x flatpack, each holds 40 tubes, 18–20 mm diameter, for total of up to 80-tube collection
7410013	Rack Set H1 , 4 x flatpack, each holds 42 capless 1.5 ml Eppendorf/microtubes for total of up to 168-microtube collection
7410014	Rack Set H2 , 4 x flatpack, each holds 63 capless 0.5 ml Eppendorf/microtubes for total of up to 252-microtube collection
7410015	Rack Set H3 , 4 x flatpack, each holds 30 reduced-volume scintillation vials, 16 mm diameter, for total of up to 120-vial collection
7410016	Rack Set H4 , 4 x flatpack, each holds 6 scintillation vials, 30 mm diameter, for total of up to 24-vial collection
7410020	BioFrac H4-High Rack Set , 4 x flatpack, each holds 6 centrifuge tubes, 30 mm diameter, for total of up to 24-vial collection
7410017	BioFrac Ice Bath/Microplate Rack , holds 120 tubes, 12–13 mm diameter; with the following capabilities: up to 4 SBS-format microplates in 96-, 48-, 24-, or 12-well configurations; Titertube microtube collection, 8 x 12, 96-tube configuration
7410018	BioFrac Prep-20 Preparative Rack , for fractionation into 1–20 collection vessels of any size
7410007	BioFrac Fraction Collector Fittings Kit , includes replacement fittings and tubing for setup of the fraction collector to the BioLogic LP or NGC system
7410088	BioFrac Microplate Drophead Kit , includes preassembled drophead nut with 0.020" ID Tefzel tubing; delivers approximately 25 µl per drop
7318263*	System Cable 3 , 8-pin mini-DIN to 8-pin mini-DIN
7318286*	System Cable 15 , 15-pin D to mini-DIN
7318287*	System Cable 16 , 8-pin mini-DIN to 8-pin standard DIN
7318290	BioFrac Accessory Cable , 15-pin D to bare wires, for connecting BioFrac fraction collector to other equipment; for input or output signals

Tubes

2239750	Clear Polystyrene Tubes , 13 x 100 mm, 9 ml nominal capacity, 1,000
2239751	Natural Polypropylene Tubes , 13 x 100 mm, 9 ml nominal capacity, 1,000
2239500	Micro Test Tubes , capless, 1.5 ml, polypropylene, natural, graduated, 500

* For more information, refer to the Cable Guide on page 165.

For NGC system-compatible products, see pages 151–156 for ordering information.

Chromatography Accessories

Cables

Refer to the guide to select cables to link chromatography system components together to a Bio-Rad chromatography system. Numbers in the table are cable numbers.

For More Information

Web: bio-rad.com/chromaccessories

Cable Guide

Connection From	Connection to										
	BioLogic DuoFlow Workstation	BioLogic LP System	BioLogic DuoFlow Controller	BioLogic QuadTec UV/Vis Detector	Non-BioLogic System Compromise	Non-BioLogic System Detectors	Model 2110 Fraction Collector	BioFrac Fraction Collector	Model EM-1 Econo UV Monitor	Model EP-1 Econo Pump	Econo Gradient Pump
BioLogic DuoFlow workstation			17, 18, or 19	17, 18, or 26			5	17, 18, or 19		7	17, 18, or 19
Model 2110 fraction collector	5	1			5				1	1	22
BioFrac fraction collector	17, 18, or 19	3, 15			*	*					3, 15
Model EG-1 Econo gradient monitor					7						
Model EM-1 Econo* UV monitor						4				3	
Model EP-1 Econo pump		7			7		1	3, 15	3		
Econo gradient pump	17, 18, or 19						22				

* For replacement of the Model 2128 accessory cable, order the BioFrac accessory cable.

Ordering Information

Catalog #	Description
7318261	System Cable 1 , 8-pin mini-DIN to DB-9 connector
7318262	System Cable 2 , 8-pin mini-DIN to 8-pin standard DIN
7318263	System Cable 3 , 8-pin mini-DIN to 8-pin mini-DIN
7318264	System Cable 4 , 8-pin mini-DIN to banana plug cable
7318265	System Cable 5 , DB-9 connector to bare wires
7318267	System Cable 7 , 8-pin mini-DIN to bare wires
7318286	System Cable 15 , 15-pin D to mini-DIN
7318287	System Cable 16 , 8-pin mini-DIN to 8-pin standard DIN
7500650	System Cable 17 , bus communication cable, 1.2 m (4')
7500651	System Cable 18 , bus communication cable, 3.7 m (12')
7500652	System Cable 19 , bus communication cable, 9.2 m (30')
7319010	System Cable 22 , Y-cable for connecting Econo gradient pump to Model 2110 fraction collector
7601321	System Cable 26 (ICM Power) , connects to 12 V power on BioLogic DuoFlow workstation
7602004	System Cable 30 , bus communication cable, 0.3 m (1')
7602032	System Cable 31 , USB cable
7318290	BioFrac Accessory Cable , 15-pin D to bare wires, for connecting BioFrac fraction collector
7885013	NGC Autosampler Cables , for connection with the NGC SIM

For NGC systems ordering information see page 151.

Low-Pressure Tubing

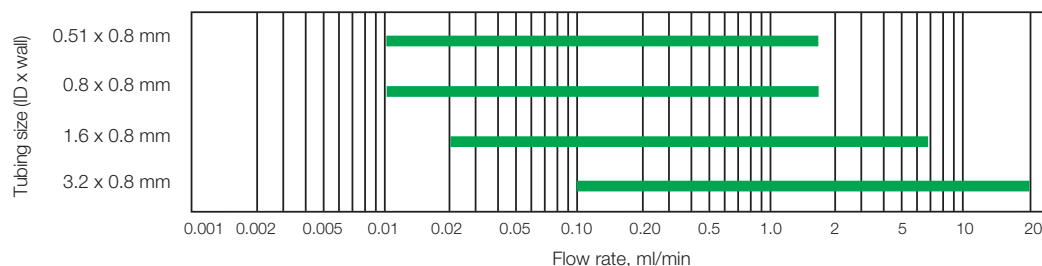
- **Silicone tubing** — contains no cytotoxic extractables and has excellent wetting properties. Autoclavable and heatable for pyrogen removal. May be damaged by concentrated acids and bases
- **Tygon tubing** — clear and tough, tolerates greater pressures than silicone; transparent; should not be autoclaved; may be damaged by high concentrations of alcohol
- **PharMed tubing** — has a wider range of chemical compatibility than silicone or Tygon and is ideal for use in pump heads of the Model EP-1 Econo pump, Econo gradient pump, and BioLogic LP system; lasts ten times longer than Tygon or silicone

- **PTFE tubing** — chemically inert; can be used with virtually any reagent, stable up to 400°C

Pump Tubing Kits

Precut tubing for the Model EP-1 Econo pump, Econo gradient pump, and BioLogic LP system is available in PharMed and silicone with a choice of 0.8, 1.6, or 3.2 mm ID. Each kit contains 20 pieces of precut pump tubing and four sets of luer lock fittings and tubing retainers.

Tubing Size Selection Chart



Tubing size selection. Comparison of flow rate ranges of various tubing sizes (ID) when used in the Econo gradient pump, the Model EP-1 Econo pump, and the BioLogic LP system.

Tubing Material Comparison

	Silicone	Tygon	PharMed	PTFE
Appearance	Translucent	Clear	Off-white	Translucent
Flexibility	Excellent	Excellent	Excellent	Fair
Autoclavability	Yes	No	Yes	Yes
Chemical compatibility	Fair	Fair	Good	Excellent
Performance in peristaltic pumps	Good	Fair	Excellent	Not acceptable

Ordering Information

Catalog #	Description
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Silicone Tubing

7318210	Silicone Tubing , 0.8 mm ID/0.8 mm wall, 10 m
7318211	Silicone Tubing , 1.6 mm ID/0.8 mm wall, 10 m
7318212	Silicone Tubing , 3.2 mm ID/0.8 mm wall, 10 m

Tygon Tubing

7318213	Tygon Tubing , 0.51 mm ID/0.8 mm wall, 10 m
7318214	Tygon Tubing , 0.8 mm ID/0.8 mm wall, 10 m
7318215	Tygon Tubing , 1.6 mm ID/0.8 mm wall, 10 m

PharMed Tubing

7318207	PharMed Tubing , 0.8 mm ID/1.0 mm wall, 10 m
7318208	PharMed Tubing , 1.6 mm ID/1.0 mm wall, 10 m
7318209	PharMed Tubing , 3.2 mm ID/1.0 mm wall, 10 m

Pump Tubing Kits

7318240	Pump Tubing Kit , 0.8 mm ID silicone, 20 precut lengths and 4 sets of fittings, for use with EP-1 Econo pump
7318241	Pump Tubing Kit , 1.6 mm ID silicone, 20 precut lengths and 4 sets of fittings, for use with EP-1 Econo pump
7318242	Pump Tubing Kit , 3.2 mm ID silicone, 20 precut lengths and 4 sets of fittings, for use with EP-1 Econo pump
7318247	Pump Tubing Kit , 0.8 mm ID PharMed, 20 precut lengths and 4 sets of fittings
7318248	Pump Tubing Kit , 1.6 mm ID PharMed, 20 precut lengths and 4 sets of fittings
7318249	Pump Tubing Kit , 3.2 mm ID PharMed, 20 precut lengths and 4 sets of fittings
7319007	Econo Gradient Pump Tubing Kit , includes 2 each of 0.8, 1.6, and 3.2 mm PharMed tubing, for use with Econo gradient pump

High-Pressure Tubing and Tubing Kits

- **PTFE FEP tubing** — recommended for pre-pump connections; can withstand medium pressure; translucent, semiflexible, chemically inert, and autoclavable
- **Tefzel or PEEK tubing** — recommended for post-pump connections; both withstand high pressure and are chemically inert and autoclavable. Tefzel is translucent and slightly flexible. PEEK is opaque; the color indicates the inside diameter
- **Tubing kits** — set of premade tubing with fittings to simplify setup of the BioLogic DuoFlow system

Ordering Information

Catalog #	Description
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7500603	PTFE FEP Tubing , 1/8" (0.125", 3.2 mm) OD x 0.062" (1.6 mm) ID, 15' (4.6 m), for pre-pump buffer inlet lines to the pump heads
7500602	Tefzel Tubing , 1/16" (0.062", 1.6 mm) OD x 0.020" (0.5 mm) ID, 30' (9.1 m), for system connections post-pump
7600604	PEEK Tubing , orange, 1/16" OD x 0.020" ID x 30', rated to 5,000 psi
7600605	PEEK Tubing , green, 1/16" OD x 0.030" ID x 30', rated to 3,000 psi
7600650	F10 Tubing Kit , includes precut and fitted PTFE, Tefzel, and orange PEEK tubing for installation of BioLogic DuoFlow basic chromatography system running at flow rates <40 ml/min
7600652	F40 Tubing Kit , includes precut and fitted PTFE, Tefzel, and green PEEK tubing for installation of BioLogic DuoFlow basic chromatography system running at flow rates ≥40 ml/min
7602002	BioLogic Maximizer Tubing Kit , includes 4 PTFE FEP prefitted tubing lengths for connection of solvent vials to the BioLogic Maximizer mixer; color coding indicates buffer solution
7602003	BioLogic Maximizer Interconnect Tubing , includes 2 PEEK prefitted tubing lengths for connection of BioLogic DuoFlow pumps to the BioLogic Maximizer valve system

Medium- and High-Pressure Fittings

The BioLogic DuoFlow and NGC fittings kit includes all parts necessary to connect medium- and high-pressure columns to medium-pressure chromatography systems.

For More Information

Download bulletin: [column connection instructions — 5326](#)

Ordering Information

Catalog #	Diagram	Description	Quantity
Medium- and High-Pressure Fittings Kit			
7600550		BioLogic DuoFlow and NGC Fittings Kit , includes PEEK and Tefzel nuts, ferrules, unions, plugs, and luer syringe	1
Individual Medium- and High-Pressure Fittings			
7885015		PEEK Nut , 1/8", 10	10
7885007		10-32 PEEK Union , 1/16", 0.020	1
7885008		Fittings Tightener , short	1
7885010		Luer to 10-32 Adaptor Fittings Kit , includes female slip luer to female 10-32 fitting to connect male end of luer column to NGC system	1
7320113		Luer to BioLogic and NGC Systems Fittings Kit , low-pressure system fittings kit, includes 1/4-28 female to male and 1/4-28 female to female luers to connect 1 cartridge to BioLogic DuoFlow and NGC systems	1
7500556		Ferrule and Lock Ring , for 1/16" OD (1.6 mm) tubing	10
7500559		Tefzel Cap , 1/4-28 female connection, to plug unused tubing	5
7500560		BioLogic Fittings Tool	1
7500561		Tefzel Union Adaptor , 1/4-28 to M6, to connect 1 M6 column to a BioLogic DuoFlow system	2
7500562		Tefzel Union , 1/4-28 to 1/4-28 to extend tubing	5
7500563		Tefzel Plug , 1/4-28 male connection, to plug unused ports on valves and columns	5
7500564		Fitting Adapters 1/4-28F to 10-32M , pkg of 2, fittings to connect one HPLC column (10-32) to BioLogic DuoFlow and NGC systems	2
7500565		Econo-Column to BioLogic System Fittings Kit , 2 fittings to connect 1 Econo-Column (luer) column to a BioLogic DuoFlow system	1 set
7500566		Bottle Cap Kit , includes 2 bottle caps, 2 plugs	1 set
7500567		UNO M6 Fittings Kit , includes 2 nuts and 4 ferrules to connect UNO column to an FPLC system	1 set
7500568		UNO 10-32 Fittings Kit , includes 2 nuts and 4 ferrules to connect UNO column to an HPLC system, for use with BioLogic DuoFlow and NGC systems	1 set
7500569		Delrin Nut , for 1/16" OD (1.6 mm) tubing	10
7500570		Delrin Nut , for 1/8" OD (3.2 mm) tubing	5
7500571		Ferrule and Lock Ring , for 1/8" OD (3.2 mm) tubing	5
7500703		Inline Filter Kit , includes 1 inline filter and 2 replacement frits	1
7500704		Replacement Frits , for inline filter kit	5
7500553		1/8" OD (3.2 mm) Pre-Pump Fittings , includes Delrin nut, ferrules, lock ring	5
7500554		1/16" OD (1.6 mm) Post-Pump Fittings , includes Delrin nut, ferrules, lock ring	10
7601308		Long Fingertight Fittings , 10-32 x 0.82", for PEEK and Tefzel tubing	4
7601311		Long Fingertight Fittings , 10-32 x 1.03", for PEEK and Tefzel tubing	4
















Low-Pressure Fittings

The low-pressure system fittings kit is useful to adapt various tubing sizes, to make liquid connections, and to direct and stop liquid flow.

For More Information

Download bulletin: [column connection instructions — 5326](#)

Ordering Information

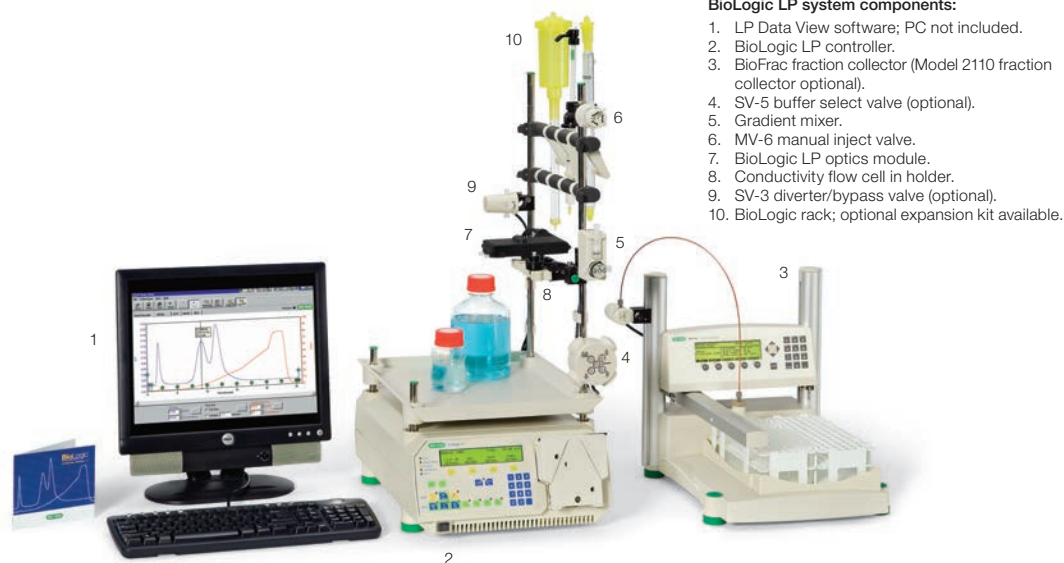
Catalog #	Diagram	Description	Quantity	Material
Low-Pressure Fittings Kit				
7318220		Low-Pressure System Fittings Kit , polycarbonate/polypropylene, 250 pieces		
7319006		Econo Gradient Pump Fittings Kit , includes 32 fittings, 12 tubing retainers		
Catalog #	Diagram	Description	Quantity	Material
Individual Low-Pressure Fittings				
7318221*		0.8 mm Barb to Female Luer	25	Polypropylene
7318222*		1.6 mm Barb to Female Luer	25	Polypropylene
7318223*		3.2 mm Barb to Female Luer	25	Polypropylene
7318224		0.8 mm Barb to Male Luer	25	Polypropylene
7318225		1.6 mm Barb to Male Luer	25	Polypropylene
7318226		3.2 mm Barb to Male Luer	25	Polypropylene
7318228		Female Luer to Female Luer	10	Polypropylene
7318230		Male Luer to Male Luer	10	Polypropylene
7318232		Female Luer Plug	25	Polypropylene
7318233		Male Luer Plug	25	Polypropylene
7318229		Female Luer T-Connector	10	Polypropylene
7328300		0.8 mm Barb to Barb Connector , recommended for minimal dead-volume connection	25	Polypropylene
7328103		3-Way Stopcock , 2 female luer to male luer	10	Polycarbonate/ polypropylene
7328102		2-Way Stopcock , female luer to male luer	10	Polycarbonate/ polypropylene
7323245		Luer Tubing Adaptor , with 5' of 0.8 mm ID PTFE tubing	5	Polypropylene/PTFE
7328202		Double Luer Tubing Adaptor , with 5' of 0.8 mm ID PTFE tubing	1	Polypropylene/PTFE
7320111		Luer to M6 Adaptor Fittings Kit , includes luer to M6 fittings to connect 1 cartridge to an FPLC system	1	PEEK/Tefzel
7320112		Luer to 10-32 Adaptor Fittings Kit , includes luer to 10-32 fittings to connect 1 cartridge to an HPLC system or NGC system	1	Polypropylene/PTFE
7320113		Luer to BioLogic and NGC Systems Fittings Kit , low-pressure system fittings kit, includes 1/4-28 female to male and 1/4-28 female to female luers to connect 1 cartridge to BioLogic DuoFlow and NGC systems	1	Polypropylene/PTFE

* Fits inlet and outlet of Econo-Column chromatography columns and low-pressure tubing.

Low-Pressure Chromatography Systems

Bio-Rad offers the BioLogic LP low-pressure chromatography system and components for protein purification. It is capable of operating from 30–45 psi (2–3.4 bar) with flow rates ranging from 0.002–40 ml/min.

BioLogic LP Systems



BioLogic LP system components:

1. LP Data View software; PC not included.
2. BioLogic LP controller.
3. BioFrac fraction collector (Model 2110 fraction collector optional).
4. SV-5 buffer select valve (optional).
5. Gradient mixer.
6. MV-6 manual inject valve.
7. BioLogic LP optics module.
8. Conductivity flow cell in holder.
9. SV-3 diverter/bypass valve (optional).
10. BioLogic rack; optional expansion kit available.

The BioLogic LP low-pressure chromatography system offers high performance, versatility, ease of use, and affordability. Its compact design minimizes the workspace required in the coldroom or on the laboratory bench. The BioLogic LP system includes features such as:

- **LP Data View software** — easy-to-use software designed for the BioLogic LP system. The software captures data, multitasks, and prints data from any computer that runs Windows 10 operating systems; requires use of one USB and/or serial port
- **Methods storage** — the system stores up to 50 methods; each method can include up to 50 pump steps and 50 fraction collection steps
- **Buffer selection** — select up to four buffers and completely automate sample separation with the addition of an SV-5 buffer select valve; the valve can also be used to automatically load large sample volumes
- **Detection capabilities** — the system includes both 254 and 280 nm filters for nucleic acid and protein detection and a conductivity cell to monitor gradient progress

- **A high-flow pump** — the system houses a peristaltic pump with a flow rate range of 0.05–40 ml/min (20 ml/min per channel; dual-channel peristaltic pump) and maximum backpressure of 30 psi (0.2 MPa). The system is compatible with Econo-Column low-pressure chromatography columns, Bio-Rad chromatography resins, GE Healthcare HiTrap cartridges, SOURCE resins, and all other low-pressure chromatography resins
- **Fraction collection** — the system offers both simple and sophisticated fraction collection choices. Collect into eighty 13 x 100 mm tubes or micro tubes using the Model 2110 fraction collector (page 160), or collect into virtually any size container, from microplates to carboys, using the BioFrac fraction collector (page 163); in addition, the BioLogic LP system supports the use of other fraction collectors
- **IEC 61010 safety certification**

Specifications for BioLogic LP Dual Peristaltic Pump

Flow rate	0.04–40 ml/min
Pressure limit	30 psi/ 2 bar
Techniques	Affinity, ion-exchange, size exclusion/desalting, HIC, CHT
UV detection	254 and 280 nm
Conductivity	0–500 mS/cm
pH monitor	—
Sample loading	Custom-sized loops and MV-6 manual sample inject valve
Fraction collection	External; Model 2110 or BioFrac fraction collector
Gradient	•

For More Information

Web: bio-rad.com/biologiclp

Download bulletin: [column connection instructions — 5326](#)

Request or download bulletins: [system information — 2038 and 2327](#)

Ordering Information

Catalog #	Description
7318300	Standard BioLogic LP System , 100/120 V, includes BioLogic LP controller, BioLogic rack, accessory kit with MV-6 manual inject valve, proportioning valve/mixer, UV optics, conductivity cell, tubing and fittings, column and conductivity cell holder, starter kit
7318301	Standard BioLogic LP System , 220/240 V, includes same as #7318300
7318302	BioLogic LP System with Model 2110 Fraction Collector , 110/120 V, includes standard BioLogic LP system, SV-3 diverter/bypass valve, system cable 1
7318303	BioLogic LP System with Model 2110 Fraction Collector , 220/240 V
7318304	BioLogic LP System with BioFrac Fraction Collector , 110/120 V, includes standard BioLogic LP system, system cables 3 and 15
7318305	BioLogic LP System with BioFrac Fraction Collector , 220/240 V
7318336	BioLogic LP System with Model 2110 Fraction Collector and LP Data View Software , 110/120 V, includes SV-3 diverter/bypass valve, system cable 1, 25' serial cable
7318337	BioLogic LP System with Model 2110 Fraction Collector and LP Data View Software , 220/240 V
7318338	BioLogic LP System with BioFrac Fraction Collector and LP Data View Software , 110/120 V, includes system cables 3 and 15, 25 serial cable
7318339	BioLogic LP System with BioFrac Fraction Collector and LP Data View Software , 220/240 V

Pump Tubing Kits

7318320*	MV-6 Manual Inject Valve , 6 ports
7318321*	SV-5 Buffer Select Valve , 5-port, 4-position solenoid random-access valve, 30 psi (2 bar) limit
7318322*	SV-3 Diverter/Bypass Valve , 3-way valve
7318323	Gradient Mixer
7318324	BioLogic LP Optics Module
7318165	UV Flow Cell , replacement
7318166	Lamp , replacement
7318167	Filter Assembly , 254 and 280 nm
7318155	Conductivity Flow Cell
7318350	BioLogic LP Starter Kit , includes buffers, standard, anion exchange cartridge

Single-Injection Sample Loops, Kits, and Accessories

7500492	100 µl PEEK Sample Loop
7500493	250 µl PEEK Sample Loop
7500494	500 µl PEEK Sample Loop
7500495	1 ml PEEK Sample Loop
7500496	2 ml PEEK Sample Loop
7500497	5 ml PEEK Sample Loop

*For more information, see page 172.

BioLogic LP Data View Software

BioLogic LP Data View software allows complete freedom to rescale chromatogram axes both during and after a run, to multitask during chromatogram data capture, and to print using any dedicated or networked printer.

LP Data View software:

- Runs on Windows 10 operating systems; requires use of one serial or USB port
- Automatically records method information for each run and allows notes to be recorded with data

- Automatically records run events such as Start, End, Fraction Advance, Hold, Pause, and Continue
- Prints customized reports
- Exports data to other applications

For More Information

Web: bio-rad.com/biologicLPcomponents
Request or download bulletin: 2038

Ordering Information

Catalog #	Description
7318365	LP Data View Software for the BioLogic LP System , includes Installation and Operation Guide, 25 ft cable, and serial to USB adaptor. Software available for download from bio-rad.com

BioLogic LP Valves

Bio-Rad offers three valve options for the BioLogic LP system.

Buffer Selection and Automated Sample Loading Valve

The optional SV-5 buffer select valve expands the preparative purification capabilities of the BioLogic LP system, allowing it to control up to four buffers and to automatically inject large-volume samples. The SV-5 valve attaches directly to the BioLogic rack and is controlled by the BioLogic LP system.

Manual Sample Injection Valve

The MV-6 injection valve has six ports with female luer fittings. It accommodates user-made loops of any volume. The MV-6 valve mounts directly on the BioLogic system rack.

Fraction Collection/Column Bypass Valve

The optional SV-3 diverter/bypass valve is a two-position solenoid valve controlled through the Model EP-1 Econo pump or the BioLogic LP system. When connected to the BioLogic LP system, the SV-3 valve directs effluent flow



from the column to a bypass position, or from the fraction collector to a waste position. The function of the valve is determined by the mini-DIN connection on the rear of the instrument and by the plumbing of the valve. When connected to the Model EP-1 Econo pump, the SV-3 valve functions only as a fraction collector diverter valve. The SV-3 valve connects directly to the BioLogic system rack.

Ordering Information

Catalog #	Description
7318321	SV-5 Buffer Select Valve , 5-port, 4-position solenoid random-access valve, 30 psi (2 bar) limit
7318320	MV-6 Manual Inject Valve , 6 ports
7318322	SV-3 Diverter/Bypass Valve , 3-way valve

BioLogic Rack

The BioLogic rack is an adaptable racking system made of durable, solvent-resistant polypropylene, stainless steel, and glass-filled nylon. In addition to supporting a range of chromatography systems it supports a range of columns and cartridges, valves, detection modules, buffer bottles, and peripheral equipment such as the Model 2110 fraction collector. A BioLogic rack expansion kit and optional rack components are available for custom racking applications.

For More Information

Web: bio-rad.com/medpressurecomponents



BioLogic rack with optional expansion kit.
Dimensions are 34 x 41 x 64 cm (W x D x H).

Ordering Information

Catalog #	Description
7500251	BioLogic Rack , includes rack tray, 8 sleeves, 2 short vertical bars, 2 long vertical bars, column clamp set, 5 bar clamps, 4 cable organizers
7500268	BioLogic Rack Expansion Kit , includes 2 rack trays, 2 long vertical bars, 16 sleeves

Accessories

7500262	Vertical Bars , long, 64 cm, 2
7500263	Vertical Bars , short, 10 cm, 2
7500264	Horizontal Bar Kit , includes 2 tie bars, 4 bar clamps
7500260	Column Clamp Set , includes 1 column clamp assembly
7500265	Bar Clamps , 5

Model EM-1 Econo UV Monitor

The Model EM-1 Econo UV monitor is a single-wavelength detector for flowthrough monitoring of effluents from chromatographic columns, centrifugation gradients, and other devices. The monitor consists of a control unit and an optics module that includes both 254 and 280 nm filters and a 2 mm pathlength flow cell.

- Portable optics module with detection close to the column outlet to maximize resolution
- Autozero functionality
- Coldroom compatibility
- LED display of absorbance



Specifications

Wavelength	254 and 280 nm	Noise	1.0×10^{-4} OD max. peak-to-peak (dry cell); 2.0×10^{-4} OD max. peak-to-peak (flowing liquid)
Sensitivity ranges	2.0, 1.0, 0.5, 0.2, 0.1, 0.05, 0.02, 0.01 AUFS	Safety	Meets IEC 61010 and CSA 22.2 certification
Detection limit	7 µg/ml (BSA in H ₂ O)	Dimensions (W x D x H)	Base unit: 14.6 x 18.6 x 20.2 cm Optics unit: 13.2 x 15.2 x 3.8 cm
Lamp	Low-pressure mercury with phosphor screen		
Filters	254 and 280 nm		
Output signal	0–1 V analog (impedance 150 Ω)		
Operating temperature	4–40°C		
Flow cell	Optical path 2 mm, internal volume 80 µl, illuminated volume 3 µl		

For More Information

Web: bio-rad.com/modelem1

Ordering Information

Catalog #	Description
7318160	Model EM-1 Econo UV Monitor , 100/120 V, includes control module, optics module, filters for 254 and 280 nm wavelengths, system cable 4, fittings kit
7318162	Model EM-1 Econo UV Monitor , 220/240 V

Accessories

7318165	UV Flow Cell , replacement
7318166	Lamp , replacement
7318167	Filter Assembly , 254 and 280 nm

Process-Scale Separations

Bio-Rad has extensive experience serving the separation technology community with process resins that offer optimal solutions for your separation needs. To order Bio-Rad process-scale resins, contact your local Bio-Rad sales representative.

Process Resin Selection Guide

Resin	Available in Process Scale Page #	Prepacked Columns and Plates Page #	Resin Sampler Pack Page #	Other Prepacked Columns Page #
Affinity				
Nuvia IMAC	102	130		124
Nuvia IMAC, uncharged	102	127		
Profinity IMAC	104	127		124
Affi-Prep Protein A	110	127		124
Affi-Gel 10/15	114	127		
Affi-Gel Blue	111	127		125
DEAE Affi-Gel Blue	111–112	127		124
CM Affi-Gel Blue	112			
Affi-Prep polymyxin	113			
Affi-Gel boronate	113			
Affi-Gel HZ	115			
Affi-Gel 102	115			
Analytical Grade Resins				
AG 1, 4	90–92			
AG 50W	90–92			
AG 501	90–92			
Chelex	90–92			
Hydrophobic Interaction				
Macro-Prep methyl HIC	118–119	127		
Macro-Prep t-butyl HIC	118–119	127		
Bio-Beads SM-2	119			
Ion Exchange				
Nuvia Q	84–86	127, 130		
Nuvia S	84–86	127, 130		
Nuvia HP-Q	84–86	127, 130		
Nuvia HR-S	84–86	127, 130		
UNOsphere Q	84–86	127, 130	120	124
UNOsphere S	84–86	127, 130	120	125
Macro-Prep High Q	87–88	127	120	125
Macro-Prep DEAE	87–88	127	120	125
Macro-Prep High S	87–88	127	120	124
Macro-Prep CM	87–88	127		
Mixed-Mode				
Nuvia aPrime 4A	95–96	127		124
Nuvia cPrime	95–96	127, 130		124
CHT Type I	97–98	127, 130	120	124
CHT Type II	97–98	127, 130	120	124
CHT XT	97–98	127		
MPC	99–100	127, 130		124
Bio-Gel HT/HTP	101			
CFT Type II	99–100	127	120	124
Size Exclusion				
Bio-Gel A	117			
Bio-Gel P	116	127		
Bio-Beads SM-2	119			
Bio-Beads S-X	118			

For product applications and descriptions, please refer to the chromatography media selection guide on pages 80–84.

Process-Scale Chromatography Resins

Nuvia resins — a family of next-generation ion-exchange and metal affinity products built on an industry proven rigid polymer base matrix. Nuvia Q and S resins offer superior flow properties and low nonspecific binding while delivering high capacity and unique selectivity. Nuvia HR-S is a high-resolution cation exchanger capable of separating very challenging high molecular weight impurities. Nuvia HP-Q is a strong anion exchange resin designed for high-throughput purification of large biomolecules, such as IgA, IgM, fibrinogen, factor VIII, von Willebrand factor, and polyethylene glycol-modified proteins. Nuvia IMAC is available in two forms: uncharged and charged with Ni²⁺. The uncharged form can be charged with the metal ion of your choice for even greater purification flexibility. Nuvia IMAC is a high-capacity metal chelate affinity resin. It has optimized particle size and high porosity that allow operation at higher flow rates without compromising binding capacity. Nuvia resins bring together a unique set of properties specifically designed to meet the demands of current and future downstream processes. Nuvia resins are flexible and robust with a large operational window, making them effective in capture and/or polish steps.

For More Information
Web: bio-rad.com/nuvia

UNOsphere resins — specialized for fast mass transfer, UNOsphere resins deliver high binding capacity at high flow rates while maintaining low backpressure. These robust polymeric resins formed by single-step polymerization carry either anionic (UNOsphere Q) or cationic (UNOsphere S) functionality, making them ideal for the efficient purification of biopharmaceutical molecules from feedstream at any stage of the downstream process.

For More Information
Web: bio-rad.com/processIEX

Macro-Prep resins — polymeric methacrylate resins are available with strong or weak ion exchange and hydrophobic (methyl and t-butyl) functionalities. These rigid macroporous hydrophilic resins provide excellent dynamic binding capacity, resolution, and throughput at high flow rates for the purification of biomolecules. Macro-Prep resins are an excellent choice for process-scale applications such as blood fractionation purification.

For More Information
Web: bio-rad.com/processIEX

Ceramic hydroxyapatite — CHT is a robust mixed-mode media with unique separation properties that delivers exceptional selectivity for purification of biomolecules. As a proven scalable polishing step in mAb and vaccine purification, CHT effectively eliminates common feedstream contaminants, such as aggregates, leached Protein A, DNA, and host cell proteins, in a single step. This provides you the flexibility to maximize your process economics. Bio-Rad now

also offers CHT XT, engineered with advanced technology, resulting in unique selectivity and robust, uniformly-sized beads with excellent pressure-flow properties.

For More Information
Web: bio-rad.com/processCHT

Ceramic fluoroapatites — MPC is a fluorinated derivative of ceramic hydroxyapatite providing the same robust impurity clearance as CHT. Use MPC media for specialty protein purification applications. CFT is a chemically pure form of fluoroapatite. It is a rigid, spherical, and macroporous media used in the purification of biologically significant compounds and is ideally suited for the bioprocessing industry. CFT can be used under stringent conditions to separate acidic proteins requiring buffered conditions as low as pH 5.6. CFT has high binding capacity and may be used reproducibly over an extended number of chromatography runs. When CFT is used, process engineers can perform purifications across a range of lower pH values to obtain optimal and reproducible results for the targeted biomolecule.

For More Information
Web: bio-rad.com/MPC
bio-rad.com/processCFT

Nuvia mixed-mode resins — Nuvia aPrime 4A and Nuvia cPrime resins are designed for process-scale purification of a wide variety of therapeutic proteins. The unique selectivity allows method developers to use hydrophobic and cation exchange modes (cPrime) and hydrophobic and anion exchange modes (aPrime) to achieve effective purification. The resins have a large design space for binding and elution, allowing for the development of highly robust methods in a commercial manufacturing setting. Nuvia resins are built on a rigid, mechanically and chemically stable macroporous base matrix with a particle size optimized to deliver exceptional flow properties, fast mass transfer, and stability.

For More Information
Web: bio-rad.com/nuvia

AG resins — AG resins are a highly referenced and extensively used line of chromatography resins for the separation of low molecular weight molecules, such as inorganic ions, organic acids, peptides, and carbohydrates, from biopharmaceutical preparations and ancillary buffers used in biomanufacturing. They are highly processed to remove impurities. Biotechnology-grade AG resins are further treated to reduce bioburden to extremely low levels, making them suitable for process-scale purification of biopharmaceuticals.

For More Information
Web: bio-rad.com/processAG

bio-rad.com/process

Chelex resin — these unique chelating resins bind polyvalent cations with high selectivity and are used to remove metal ions from samples and buffers. They are extensively used in environmental applications, such as glyphosate isolation. Chelex resins are made from a styrene divinylbenzene support coupled to paired iminodiacetate ions.

For More Information

Web: bio-rad.com/processAG

Visit bio-rad.com/samplenow to request samples of these resins.

Bio-Beads SM-2 resin — nonpolar polystyrene-based resin for hydrophobic interaction chromatography, Bio-Beads are used extensively for the removal of nonpolar detergents from biological preparations for manufacturing at both laboratory and process scale. The resin is reusable and can be easily cleaned with alcohol solutions followed by a distilled water rinse.

For More Information

Web: bio-rad.com/processHIC

Chromatography Resin Screening Tools

Foresight Prepacked Plates and Columns

Foresight plates and columns are prepacked with a range of Bio-Rad's process chromatography resins, offering process scientists convenience and reliability for their high-throughput experimentation needs. Their robust design allows process scientists to use the prepacked formats through the entire purification development cycle from high-throughput media screening and small-scale method development to scale-up optimization.

- Prepacked and ready-to-use formats are designed to save process development time
- Different experimental conditions can be evaluated to better define an operational window
- High-throughput experiments with minimal sample requirements can be performed
- Available in a variety of chromatography resin modes designed for large-scale bioprocess
- Compatible with robotic liquid handling workstations

For More Information

Web: bio-rad.com/foresight



Chromatography Media Available in Foresight Formats

Chromatography Resin	Mode
UNOsphere Q	Strong anion
UNOsphere S	Strong cation
Nuvia Q	Strong anion
Nuvia S	Strong cation
Nuvia HR-S	Strong cation
Nuvia HP-Q	Strong anion
Nuvia cPrime	Mixed-mode hydrophobic: cationic
Nuvia aPrime 4A	Mixed-mode hydrophobic: anionic
MPC Type I — 40 µm particle size	Mixed-mode metal affinity: cationic
CHT Type I — 40 µm particle size	Mixed-mode metal affinity: cationic
CHT Type II — 40 µm particle size	Mixed-mode metal affinity: cationic
CHT XT	Mixed-mode metal affinity: cationic
Nuvia IMAC	Metal affinity

Ordering Information

Catalog # Description

Foresight Plates, 2 x 96-Well

732-4714	Foresight UNOsphere Q, 20 µl
732-4710	Foresight UNOsphere S, 20 µl
732-4703	Foresight Nuvia Q, 20 µl
732-4701	Foresight Nuvia S, 20 µl
732-4707	Foresight Nuvia HR-S, 20 µl
12006908	Foresight Nuvia HP-Q, 20 µl
732-4705	Foresight Nuvia cPrime, 20 µl
732-4716	Foresight CHT Type I, 40 µm, 20 µl
732-4718	Foresight CHT Type II, 40 µm, 20 µl
732-4785	Foresight MPC Type I, 40 µm, 20 µl
12004035	Foresight Nuvia IMAC Ni-Charged, 20 µl
12003151	Foresight CHT XT Plates, 40 µm, 20 µl
12007411	Foresight Nuvia aPrime 4A Plates, 20 µl

Description

1 ml

5 ml

Foresight Columns

Foresight UNOsphere Q	732-4732	732-4752
Foresight UNOsphere S	732-4730	732-4750
Foresight Nuvia Q	732-4721	732-4741
Foresight Nuvia S	732-4720	732-4740
Foresight Nuvia HR-S	732-4723	732-4743
Foresight Nuvia HP-Q	12007020	12007021
Foresight Nuvia cPrime	732-4722	732-4742
Foresight CHT Type I, 40 µm	732-4735	732-4755
Foresight CHT Type II, 40 µm	732-4736	732-4756
Foresight MPC Type I, 40 µm	732-4737	732-4757
Foresight Nuvia IMAC Ni-Charged	12004038	12004037
Foresight Nuvia aPrime 4A Column	12007392	12007393
Foresight CHT XT Column, 40 µm	12003150	12003149

Description

200 µl

600 µl

Foresight RoboColumn Units, 1 row of 8 columns*

Foresight UNOsphere Q	732-4819	732-4820
Foresight UNOsphere S	732-4813	732-4814
Foresight Nuvia Q	732-4804	732-4805
Foresight Nuvia S	732-4801	732-4802
Foresight Nuvia HR-S	732-4831	732-4832
Foresight Nuvia HP-Q	12007013	12007014
Foresight Nuvia cPrime	732-4807	732-4808
Foresight CHT Type I, 40 µm	732-4822	732-4823
Foresight CHT Type II, 40 µm	732-4825	732-4826
Foresight MPC Type I, 40 µm	732-4828	732-4829
Foresight Nuvia IMAC Ni-Charged	12004051	12004052
Foresight Nuvia aPrime 4A RoboColumn Unit	12007394	12007395
Foresight CHT XT RoboColumn Units, 40 µm	12003152	12003148

* Foresight RoboColumn units are to be used with robotic liquid handling workstations.

Please visit bio-rad.com/foresight for more information on prepacked columns and plates. For additional prepacked formats see EconoFit Chromatography Columns on page 127.

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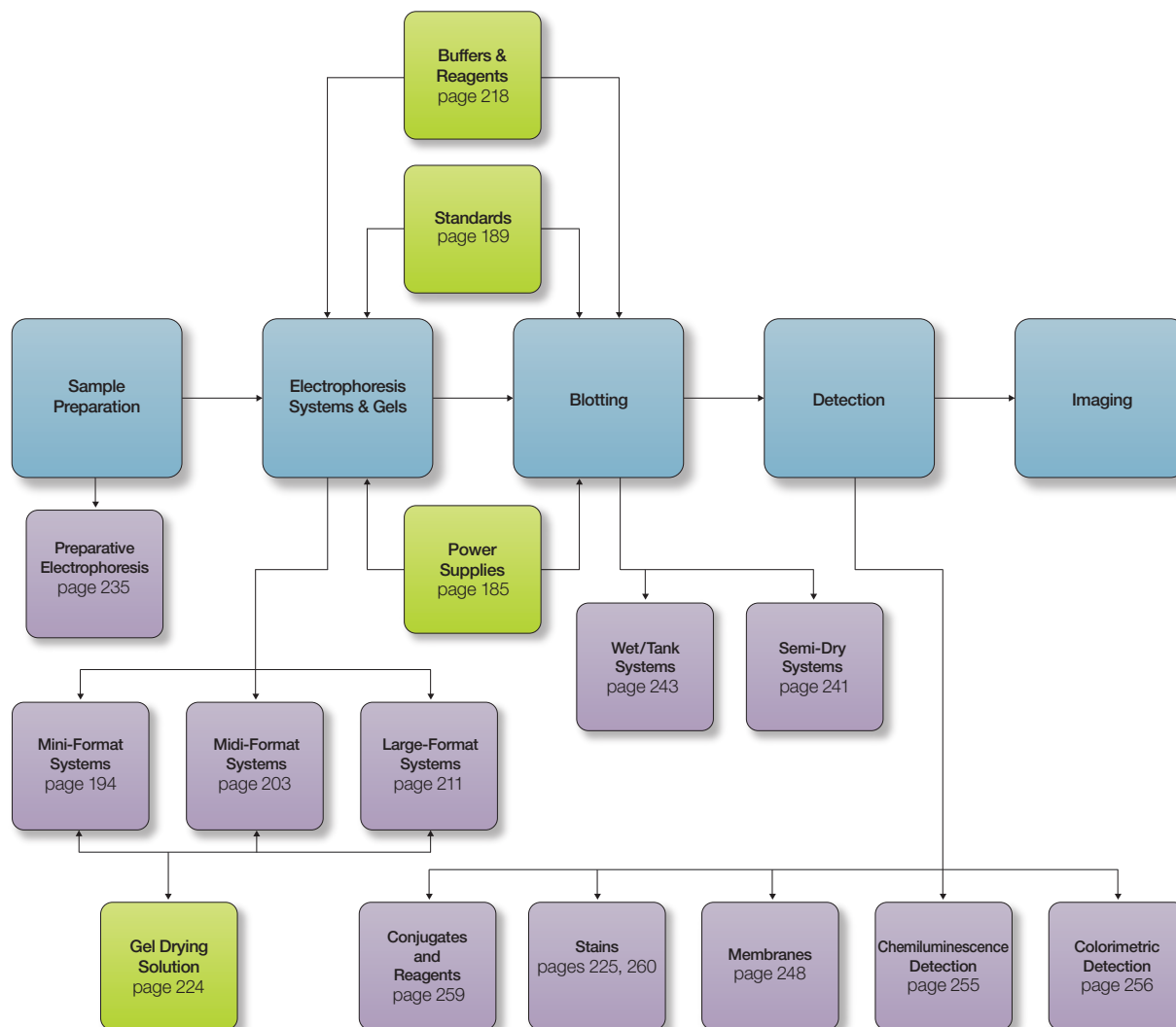
Electrophoresis and Blotting Solutions

Bio-Rad offers a complete solution for all of your electrophoresis and blotting needs, from sample preparation to imaging. Built on over 50 years of pioneering expertise, our innovative products offer reliable, reproducible results for all of your applications.

Protein Electrophoresis

A complete suite of electrophoresis products, from cells and precast gels to buffers and reagents, is available for the separation of proteins.

 [Learn More About the Technology](#)
 Web: bio-rad.com/tech/proteinelectro

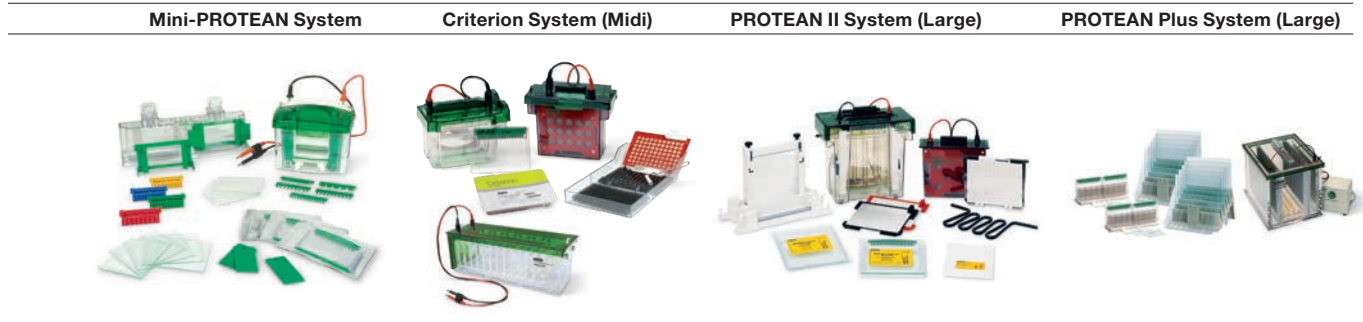


Overview of Vertical Gel Electrophoresis Systems

The Mini-PROTEAN, Criterion, PROTEAN II, and PROTEAN Plus systems all consist of electrophoresis cells and blotting equipment. These systems provide:

- A choice of four size formats with options to meet your specific needs for resolution, capacity, and processing speed
- Cell designs that eliminate current leakage to provide the most reproducible gels and consistent run times
- Dodeca cells for high-throughput 2-D separations in mini-, midi-, and large-format gel sizes

Vertical Electrophoresis System Selection Guide



	Mini-PROTEAN System	Criterion System (Midi)	PROTEAN II System (Large)	PROTEAN Plus System (Large)
Advantages	<ul style="list-style-type: none"> Run 1–4 precast or handcast gels in mini format with the Mini-PROTEAN Tetra cell Wing clamp assembly allows easy, fast setup and leak-free operation Minimize reagent cost and waste Fastest turnaround of 2-D data for 2-D-in-a-day capability Run up to 12 mini handcast or precast gels with the Mini-PROTEAN Dodeca cell 	<ul style="list-style-type: none"> Fast setup with drop-in gel and cell design (precast or handcast) Run 1–2 precast Criterion or handcast gels with the Criterion cell Integrated upper buffer chamber ensures leak-free operation Optimal combination of pI separation and fast run times Capability for <1 hr 2-D runs for 2-D-in-a-day results Run up to 12 midi handcast or precast gels with the Criterion Dodeca cell 	<ul style="list-style-type: none"> Large-format gel system offers greater resolution over smaller formats and can be used with handcast gels Versatility to perform 1-D or 2-D gel electrophoresis Can accommodate up to 4 gels and is available in xi or XL format for running a variety of gel sizes 	<ul style="list-style-type: none"> Offers maximum resolution in a single gel and the longest range of molecular weight (MW) separation Run up to 12 gels with the PROTEAN Plus Dodeca cell
Compatible Gel Formats	<ul style="list-style-type: none"> Precast: Mini-PROTEAN precast gels (page 198) Handcast: Mini-PROTEAN empty cassettes (pages 198, 201) and Mini-PROTEAN casting plates (page 196) 	<ul style="list-style-type: none"> Precast: Criterion, Criterion TGX, and Criterion XT precast gels (page 204) Handcast: Criterion empty cassettes (page 209) 	<ul style="list-style-type: none"> PROTEAN II casting plates (page 213) 	<ul style="list-style-type: none"> PROTEAN Plus casting equipment (page 216)
Electrophoresis Cells	<ul style="list-style-type: none"> Mini-PROTEAN Tetra (page 194) Mini-PROTEAN 3 Dodeca (page 197) 	<ul style="list-style-type: none"> Criterion (page 203) Criterion Dodeca (page 203) 	<ul style="list-style-type: none"> PROTEAN II xi/XL (page 211) 	<ul style="list-style-type: none"> PROTEAN Plus Dodeca

continues

Vertical Electrophoresis System Selection Guide

	Mini-PROTEAN System	Criterion System	PROTEAN II System	PROTEAN Plus System
Gel Dimensions				
(W x L x thickness)	Mini-PROTEAN precast gels: 8.6 x 7.2 x 0.1 cm	Criterion precast gels: 13.3 x 8.7 x 0.1 cm		
Gel Cassette Dimensions				
(W x L)	10.0 x 8.0 cm	15.0 x 10.6 cm	20.0 x 18.3 cm	18.5 x 20.5 cm 20.0 x 20.5 cm 25.0 x 20.5 cm
Compatible Transfer Systems				
Wet/tank transfer	Mini Trans-Blot cell (page 243)	Criterion wire blotter (page 244)	Trans-Blot cell (page 245)	Trans-Blot Plus cell
	Criterion blotter (page 244)	Criterion plate blotter (page 244)	Trans-Blot Plus cell	
	Trans-Blot cell (page 245)	Trans-Blot cell (page 245) Trans-Blot Plus cell		
Semi-dry transfer	Trans-Blot SD cell (page 242)	Trans-Blot SD cell (page 242)	Trans-Blot SD cell (page 242)	
	Trans-Blot Turbo (page 241)	Trans-Blot Turbo (page 241)		

Precast Gels

Bio-Rad offers a broad range of precast gels, including two size formats of polyacrylamide gels for a number of vertical protein and nucleic acid electrophoresis applications, and one set of agarose gels for horizontal nucleic acid electrophoresis. These gels are part of complete systems of compatible electrophoresis and blotting cells. Refer to the following table to select the appropriate gel type and buffers for your polyacrylamide gel-based applications.

Availability of Precast Gel Types Based on Application

Gel Type	Mini-PROTEAN	Criterion	Application	Sample Buffer	Running Buffer
TGX	•	•	SDS-PAGE Native PAGE	Laemmli Native	Tris/glycine/SDS Tris/glycine
Tris-HCl		•	SDS-PAGE Native PAGE	Laemmli Native	Tris/glycine/SDS Tris/glycine
Stain-free	•	•	SDS-PAGE	Laemmli	Tris/glycine/SDS
Bis-Tris		•	SDS-PAGE for small to large proteins	XT	XT MOPS or XT MES
Tris-acetate	•	•	SDS-PAGE for large proteins Native PAGE	XT Native	XT Tricine Tris/glycine
Tris-Tricine	•	•	SDS-PAGE for peptides, small proteins	Tricine	Tris/Tricine/SDS
IEF		•	IEF	IEF	Anode and cathode buffer
TBE	•	•	dsDNA separation	Nucleic acid	Tris/boric acid/EDTA
TBE-urea	•	•	ssDNA and RNA separation	TBE-urea	Tris/boric acid/EDTA

In general, single-percentage gels will best separate bands that are close in MW. If your sample contains a broad range of MWs, a gradient gel allows both high and low MW bands to be resolved on the same gel. Molecules with a range of sizes can be separated on linear gradient gels because the larger pore sizes allow resolution of larger molecules, while pore sizes that decrease toward the bottom of the gel restrict excessive separation of small molecules.

Power Supplies

Bio-Rad offers a complete line of power supplies that are certified to IEC 1010-1, EN 61010 — the most rigorous international safety standard — to ensure the highest personal and environmental protection.

Power Supply Selection Guide

Technique and Recommended Apparatus	Gel or Tube Size (W x L x Thickness);* Qty	Typical Conditions** (Initial)			Typical Conditions** (Final)			Typical Run Time	PowerPac Power Supply
		W	V	mA	W	V	mA		
Laemmli (SDS), O'Farrell Second Dimension (SDS)									
PROTEAN II xi cell	160.0 x 160.0 x 1.5 mm, 2 gels	—	100	35(C)	—	350	35(C)	5 hr	HV or Universal
PROTEAN II XL cell	183.0 x 200.0 x 1.5 mm, 2 gels	—	100	35(C)	—	350	35(C)	5 hr	HV or Universal
Criterion cell	133.0 x 87.0 x 1.0 mm, 2 gels	—	200(C)	200	—	200(C)	80	55 min	Basic or HC
Criterion cell	133.0 x 87.0 x 1.0 mm, 2 gels	—	300(C)	224	—	300(C)	164	20–26 min	Basic, HV, or Universal
Mini-PROTEAN Tetra cell	83.0 x 73.0 x 1.0 mm, 4 gels	—	200(C)	240	—	200(C)	120	35–45 min	Basic or HC
Mini-PROTEAN Tetra cell	83.0 x 73.0 x 1.0 mm, 4 gels	—	300(C)	360	—	300(C)	228	15 min	Basic, HV, or Universal
Mini-PROTEAN Tetra cell	83.0 x 73.0 x 1.0 mm, 4 gels	—	400(C)	456	—	400(C)	416	10 min	HV or Universal
High-Throughput Electrophoresis									
PROTEAN Plus	200.0 x 205.0 x 1.0 mm, 12 gels	—	200(C)	1,000	—	200(C)	350	6 hr	HC or Universal
Dodeca cell	250.0 x 205.0 x 1.0 mm, 12 gels	—	200(C)	1,000	—	200(C)	350	6 hr	HC or Universal
Dodeca cell	256.0 x 230.0 x 1.0 mm, 12 gels	—	150(C)	1,200	—	150(C)	300	18–20 hr	HC or Universal
Criterion Dodeca cell	133.0 x 87.0 x 1.0 mm, 12 gels	—	200(C)	1,000–1,400	—	200(C)	400–500	55 min	HC or Universal
Mini-PROTEAN 3 Dodeca cell	83.0 x 73.0 x 1.0 mm, 12 gels	—	200(C)	600	—	200(C)	360	45 min	HC or Universal
IEF, O'Farrell First Dimension									
PROTEAN II xi cell	150.0 x 1.5 mm tubes, 4 (minimum)	—	800(C)	3.5	—	800(C)	<1	16 hr	HV or Universal
Mini-PROTEAN II tube cell	75.0 x 1.0 mm tubes, 8 (minimum)	—	750(C)	1	—	750(C)	<1	3–4 hr	HV or Universal
Preparative PAGE									
Model 491 prep cell	—	10(C)	300	40	10(C)	400	30	3–8 hr	HV or Universal
Mini prep cell	—	1(C)	200	5	1(C)	300	3	3–8 hr	HV or Universal
Protein Electroelution									
Model 422 electro-eluter	6 samples	—	200	60(C)	—	150	60(C)	3–4 hr	Basic, HV, or Universal
Polyacrylamide Analytical Electrofocusing									
Model 111 mini IEF cell	125.0 x 65.0 x 0.4 mm	—	100(C)	6	—	100(C)	4	15 min	HV or Universal
		—	200(C)	6	—	200(C)	4	15 min	
		—	450(C)	4	—	450(C)	1	1 hr	
DNA Restriction Analysis (Horizontal Mode)									
Sub-Cell GT cell	150.0 x 200.0 x 5.0 mm	—	80(C)	55	—	80(C)	60	4 hr	Basic or HC
Mini-Sub Cell GT cell	70.0 x 100.0 x 5.0 mm	—	50(C)	25	—	50(C)	30	2 hr	Basic
Wide Mini-Sub Cell GT cell	150.0 x 100.0 x 5.0 mm	—	50(C)	35	—	50(C)	40	2 hr	Basic
Western Blotting									
Mini Trans-Blot cell	83.0 x 73.0 x 0.75 mm, 2 gels	—	100(C)	250	—	100(C)	450	1 hr	HC
Criterion blotter									
Wire electrodes	133.0 x 87.0 x 1.0 mm, 2 gels	—	100(C)	250	—	100(C)	450	1 hr	HC
Plate electrodes	133.0 x 87.0 x 1.0 mm, 2 gels	—	100(C)	650	—	100(C)	1,600	30 min	HC
Trans-Blot cell									
Wire electrodes	200.0 x 160.0 x 1.5 mm, 1 gel	—	60(C)	210–250	—	60(C)	210–250	5 hr	HC
Plate electrodes	200.0 x 160.0 x 1.5 mm, 1 gel	—	100–150(C)	1,000–1,600	—	100–150(C)	1,000–1,600	1–5 hr	HC
High-intensity transfer	200.0 x 160.0 x 1.5 mm, 1 gel	—	50–100(C)	1,600	—	50–100(C)	1,600	30 min	HC
Trans-Blot Plus cell	265.0 x 280.0 x 1.5 mm, 3 gels	—	100(C)	3,000	—	100(C)	3,000	30 min–1 hr	HC
Semi-Dry Blotting									
Trans-Blot SD cell									
Protein	250.0 x 180.0 x 1.5 mm	—	15(C)	500	—	15(C)	200	15–30 min	HC
DNA/RNA	150.0 x 150.0 x 6.0 mm	—	15	650(C)	—	25	650(C)	10–30 min	HC

* Sizes shown are typical for the corresponding apparatus. For running conditions for additional sizes, see the product instruction manuals.

** (C) = constant; typical conditions are listed as guidelines only and can vary based on sample, buffers, etc.

PowerPac Power Supply Specifications

	PowerPac Basic	PowerPac HC	PowerPac HV	PowerPac Universal
Output range (programmable)				
Volts	10–300 V	5–250 V	20–5,000 V	10–500 V
Current	4–400 mA	0.01–3.0 A	0.01–500 mA	0.01–2.5 A
Power	75 W (maximum)	1–300 W	1–400 W	1–500 W
Type of output (with automatic crossover)	Constant voltage or constant current	Constant voltage, constant current, or constant power	Constant voltage, constant current, constant power, or constant temperature	Constant voltage, constant current, or constant power
Timer	1–999 min	1 min–99 hr, 59 min	1 min–99 hr, 59 min	1 min–99 hr, 59 min
Volt-hour control	—	—	• (99,000 V-hr)	• (99,000 V-hr)
Pause/resume function	•	•	•	•
Display	3-digit LED	16-character x 2-line LCD	128 x 64 pixel, backlit graphics LCD	128 x 64 pixel, backlit graphics LCD
Programmable methods	—	1 method up to 3 steps, no storage capability	Stores 9 methods, each with up to 9 steps	Stores 9 methods, each with up to 9 steps
Real-time clock	—	—	•	•
Automatic recovery after power failure	•	•	•	•
Temperature control	—	—	Via temperature probe; 30–90°C ± 2°C	—
Microampere readout	—	—	•	—
Safety features	No-load detection; sudden load change detection; overload/short-circuit detection; overvoltage protection	No-load detection; sudden load change detection; ground leak detection; overload/short-circuit detection; overvoltage protection	No-load detection; sudden load change detection; ground leak detection; arc detection; overload/short-circuit detection; overvoltage protection	No-load detection; sudden load change detection; ground leak detection; overload/short-circuit detection; overvoltage protection
Operating conditions	0–40°C; 0–95% humidity	0–40°C; 0–95% humidity	0–40°C; 0–95% humidity	0–40°C; 0–95% humidity
Stackable	•	•	•	•
Number of output jacks	4 sets in parallel	4 sets in parallel	4 sets in parallel	4 sets in parallel
Regulatory	EN-61010, CE	EN-61010, CE	EN-61010, CE	EN-61010, CE
Input power (actual)	90–120 or 198–264 VAC, 50/60 Hz, autoswitching	90–120 or 198–264 VAC, 50/60 Hz, autoswitching	90–120 or 198–264 VAC, 50/60 Hz, autoswitching	90–120 or 198–264 VAC, 50/60 Hz, autoswitching
Dimensions (W x D x H)	21.0 x 24.5 x 6.5 cm	25.0 x 28.5 x 8.0 cm	27.5 x 34.0 x 10.0 cm	27.5 x 34.0 x 10.0 cm
Weight	1.1 kg (2.4 lb)	2.0 kg (4.4 lb)	2.85 kg (6.3 lb)	2.5 kg (5.5 lb)

PowerPac Basic Power Supply



- Recommended for basic applications
- Compact, stackable
- Constant voltage or constant current output

For More Information
Request or download bulletin: 6371

See Also

Mini-PROTEAN
Tetra cell:
page 194.
Criterion cell:
page 203.
Sub-Cell systems:
page 262.

Ordering Information

Catalog #	Description
1645050	PowerPac Basic Power Supply, 100–120/220–240 V

PowerPac HC High-Current Power Supply



- Recommended for high-current applications
- Output of 250 V, 3.0 A, 300 W
- 2-line, 16-character LCD for programming
- Constant voltage, constant power, or constant current output

For More Information
Request or download bulletin: 6371

See Also

Criterion blotter:
page 244.
Mini Trans-Blot cell:
page 243.
Trans-Blot cell:
page 245.
Dodeca cells:
pages 197, 203.

Ordering Information

Catalog #	Description
1645052	PowerPac HC Power Supply, 100–120/220–240 V

PowerPac HV High-Voltage Power Supply



- Ideal for IEF and DNA sequencing
- Output of 5,000 V, 500 mA, and 400 W

Optional temperature probe monitors gel temperature between 30–90°C during electrophoresis. The probe attaches to the glass plate and sends temperature data to the power supply, which adjusts the power output to maintain a constant temperature during electrophoresis.

For More Information
Request or download bulletin: 6371

See Also

Model 491 prep cell
and mini prep cell:
page 235.

Ordering Information

Catalog #	Description
1645056	PowerPac HV Power Supply, 100–120/220–240 V
1645059	PowerPac HV Power Supply with Temperature Probe, 100–120/220–240 V
1655058	PowerPac Temperature Probe

See Also

High-throughput electrophoresis systems: pages 197, 203.
Western blotting: page 238.

PowerPac Universal Power Supply



- For all applications from mini vertical and high-throughput electrophoresis to blotting
- Protocol binder and test box to support IQ/OQ within GLP- and FDA-regulated environments

Wireless run data transfer software organizes, displays, prints, analyzes, exports, and annotates run data from the power supply. Data can be sent directly to a PC with a peripheral IR receiving device.

For More Information
Request or download bulletin: 6371

Ordering Information

Catalog #	Description
1645070	PowerPac Universal Power Supply, 100–120/220–240 V

PowerPac Adaptor



- Convert non-IEC-certified electrophoresis cells to fit output terminals of PowerPac power supplies
- Available in two sizes that fit most 2 and 4 mm banana plugs
- Compatible with the discontinued PowerPac 200, 300, 1000, and 3000 power supplies

Ordering Information

Catalog #	Description
1645062	PowerPac Adaptor, 2 mm
1645064	PowerPac Adaptor, 4 mm

Protein Standards

Standards are an integral part of every electrophoresis experiment because they help identify and characterize the molecules separated in a gel. Prestained and unstained MW standards are available for SDS-PAGE, IEF, 2-D PAGE, and western blotting. For migration charts with different types of gels, see pages 199 (Mini-PROTEAN TGX gels) and 205–209 (Criterion gels).

For More Information

Download bulletins: 2414 and 3118

Request or download bulletin: 2998

Protein Standards Selection Guide

	Precision Plus Protein Standards						Specialty Standards		
	WesternC	Kaleidoscope	Dual Xtra	Dual Color	All Blue	Unstained	IEF	2-D	Standard Plugs***
Molecular weight (MW)/pI range, kD	10–250 kD	10–250 kD	2–250 kD	10–250 kD	10–250 kD	10–250 kD	4.45–9.6 pI	17.5–76 kD 4.5–8.5 pI	10–250 kD
Number of proteins	10	10	12	10	10	10	9	7	10
Electrophoresis									
SDS-PAGE	•	•	•	•	•	•	–	–	•
Accurate MW estimation	•	•	•	•	•	•	–	–	•
Multicolored	•	•	•	•	–	–	–	–	–
Coomassie staining	•	•	•	•	•	•	•	•	•
Fluorescent staining	–	–	–	–	–	•	–	•	•
2-D electrophoresis	–	–	–	–	–	–	–	•	–
IEF	–	–	–	–	–	–	•	–	–
Plug format for use in gels with no reference well	–	–	–	–	–	–	–	–	•
Blotting									
Monitoring transfer efficiency	•	•	•	•	•	–	–	–	–
Coomassie staining	•	•	•	•	•	•	–	•	•
Fluorescent staining	–	–	–	–	–	•	–	•	•
Fluorescent blotting*	•	•	•	•	•	–	–	–	–
Immunodetection**	•	–	–	–	–	•	–	–	•
Catalog Numbers									
Single unit	1610385	1610375	1610377	1610374	1610373	1610363	1610310	1610320	1610378
Value pack of 5 units	1610398	1610395	1610397	1610394	1610393	1610396	–	–	–

* These standards have fluorescent properties and can be used for fluorescent blotting applications. See bulletin 5723 for details on using Precision Plus Protein WesternC standards for fluorescent multiplexing. Precision Plus Protein Dual Xtra standards (#1610377) are recommended for fluorescent blot analysis of proteins between 5–250 kD.

** Immunodetection via addition of a Precision Protein StrepTactin and horseradish peroxidase (HRP) or StrepTactin and alkaline phosphatase (AP) conjugate, which will bind to the internal *Strep*-tags on the proteins.

*** 24 unstained plugs for 2-D gels.

Recombinant Prestained and Unstained Standards

Precision Plus Protein standards offer accurate and consistent recombinant protein standards for electrophoresis and western blotting experiments. These protein standards offer a good balance between band sharpness and brightness, accurate MW estimation, reproducible migration patterns, and excellent blotting results.

See Also

Vertical electrophoresis systems: page 194.
Horizontal electrophoresis systems: page 261.
Electrophoresis and blotting buffers: pages 218, 252.
Protein electrophoresis stains: page 225.
Protein blotting stains: page 260.
ChemIDoc MP imaging system: page 299.

Precision Plus Protein Standards

Precision Plus Protein standards contain up to 12 recombinant bands that exhibit reproducible and consistent migration regardless of staining. This family of standards includes six unique options – one unstained, four prestained (All Blue, Dual Color, Dual Xtra, Kaleidoscope), and one multi-application standard, WesternC. Features include:

- Reproducible and accurate migration pattern, allowing MW estimation
- Exceptional band sharpness, providing clear confirmation of electrophoretic separation
- *Strep*-tag affinity sequence, allowing detection and MW determination on western blots
- Natural fluorescence properties, allowing fluorescent and multiplex fluorescent detection
- Superior compatibility with TGX Stain-Free precast gels (Unstained and All Blue)

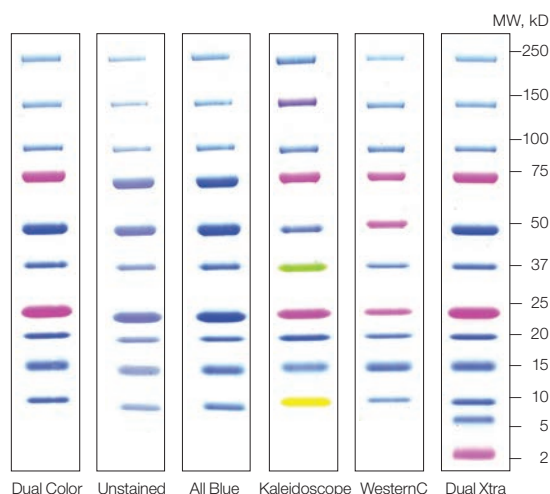
Improved Dual Color Standard

- Brighter for easier identification of target proteins
- Stronger band intensity throughout blot development
- Sharper for more accurate molecular weight estimation

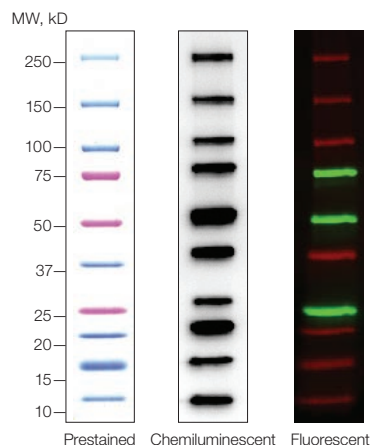
Precision Plus Protein WesternC Standards

Precision Plus Protein WesternC is a versatile, multi-application protein standard offering colorimetric, chemiluminescent, and fluorescent properties all in one. WesternC contains ten prestained bands from 10–250 kD that provide electrophoretic confirmation on a gel, verification of transfer efficiency on a blot, and detection and MW estimation on fluorescent western blots. Features include:

- Reproducible and accurate migration pattern, allowing MW estimation
- Exceptional band sharpness, providing clear confirmation of electrophoretic separation
- Chemiluminescent detection and MW determination on western blots when probed with StrepTactin conjugates
- Fluorescent and multiplex fluorescent detection when excited with red (~635 nm) or green (~532 nm) channels
- Prestained blue standards, with three pink high-intensity reference bands at 25, 50, and 75 kD
- Ready-to-use formulation



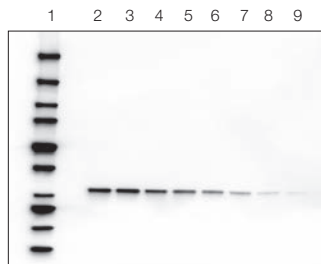
The Precision Plus Protein standards family.



Precision Plus Protein WesternC standard and its multiple applications offer many detection options.

For More Information

Download bulletins: 5561, 2847 and 5576; multiplex fluorescence detection — 5685 and 5723



Western blot detection of 27 kD protein and Precision Plus Protein WesternC standards using the Immun-Star WesternC chemiluminescence detection kit. Maximum sensitivity achievable with the Immun-Star WesternC kit is in the mid-femtogram range. A gel run with 5 μ l of Precision Plus Protein WesternC standards (lane 1) and a dilution series of *E. coli* lysate containing an overexpressed 27 kD protein (lanes 2–9) was transferred to a nitrocellulose membrane. The dilutions were: 200, 150, 100, 75, 50, 25, 12, and 6 ng. The blot was probed with a primary antibody specific for the 27 kD protein, then incubated with StrepTactin-horseradish peroxidase (HRP) and a secondary antibody conjugated to HRP. After incubation in the Immun-Star WesternC detection solution for 5 min, the blot was imaged using the ChemiDoc XRS system.

For More Information
 Web: bio-rad.com/pppstandards

Precision Plus Protein Standard Plugs for 2-D Gels
 Precision Plus Protein standard plugs allow easy, quick, and clean loading of MW standards on any gel. The plugs are especially useful for vertical 2-D gels with no reference well. Precision Plus Protein unstained standards are cast in 1 mm thick agarose plugs for easy storage, handling, and loading. Load concentrations have been optimized for SYPRO Ruby, Silver Stain Plus, and Bio-Safe Coomassie stains.

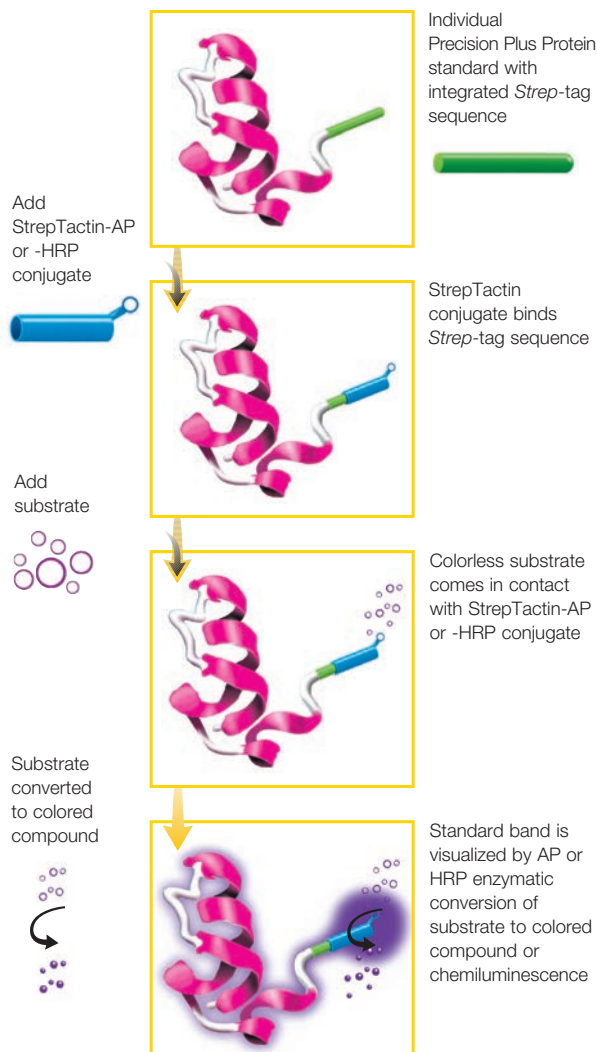
Precision Plus Protein standard plugs come in easy-to-use snap-off molds in packs of 24 (one application per plug). Advantages include:

- Unchanging MWs, so band sizes are easy to remember
- A ready-to-use, load-and-go format — just snap, twist, and load the plug onto a gel
- *Strep*-tag amino acid sequence for detection and MW estimation on western blots



Precision Plus Protein Standard Plugs

For More Information
 Web: bio-rad.com/standardplugs
 Download bulletin: 3036



Overview of the StrepTactin detection system.

Precision Plus Protein Standards Specifications

Product	Volume	Number of Applications	Shelf Life
Unstained	1 ml	100	1 year at -20°C
All Blue	500 µl	50	6 months at 4°C or 1 year at -20°C
Dual Color	500 µl	50	6 months at 4°C or 1 year at -20°C
Kaleidoscope	500 µl	50	1 year at -20°C
Dual Xtra	500 µl	50	6 months at 4°C or 1 year at -20°C
WesternC	250 µl	50	1 year at -20°C
WesternC pack*	250 µl standard 125 µl HRP conjugate	50	1 year at -20°C
Unstained plugs	24 plugs	24	1 month at 4°C (once opened)

* WesternC pack comes with WesternC protein standard and StrepTactin-HRP conjugate, needed for colorimetric or chemiluminescent blot detection. StrepTactin-AP conjugate is also available (#1610382).

Ordering Information

Catalog #	Description
1610363	Precision Plus Protein Unstained Standards , 1,000 µl, 100 applications
1610396	Precision Plus Protein Unstained Standards Value Pack , 5 x 1,000 µl, 500 applications
1610373	Precision Plus Protein All Blue Standards , 500 µl, 50 applications
1610393	Precision Plus Protein All Blue Standards Value Pack , 5 x 500 µl, 250 applications
1610374	Precision Plus Protein Dual Color Standards , 500 µl, 50 applications
1610394	Precision Plus Protein Dual Color Standards Value Pack , 5 x 500 µl, 250 applications
1610375	Precision Plus Protein Kaleidoscope Standards , 500 µl, 50 applications
1610395	Precision Plus Protein Kaleidoscope Standards Value Pack , 5 x 500 µl, 250 applications
1610385*	Precision Plus Protein WesternC Pack , 250 µl WesternC standard, 125 µl HRP conjugate, 50 applications
1610398*	Precision Plus Protein WesternC Pack, Value Pack , 5 x 250 µl WesternC standard, 5 x 125 µl HRP conjugate, 250 applications
1610376*	Precision Plus Protein WesternC Standards , 250 µl, 50 applications
1610399*	Precision Plus Protein WesternC Standards Value Pack , 5 x 250 µl, 250 applications
1610377	Precision Plus Protein Dual Xtra Standards , 500 µl, 50 applications
1610397	Precision Plus Protein Dual Xtra Standards Value Pack , 5 x 500 µl, 250 applications

StrepTactin Conjugates for Precision Plus Protein Standards

1610380	Precision Protein StrepTactin-HRP Conjugate , 300 µl, 150 applications
1610381	Precision Protein StrepTactin-HRP Conjugate , 125 µl, 50 applications
1610382	Precision Protein StrepTactin-AP Conjugate , 300 µl, 150 applications

Precision Plus Protein Standard Plugs

1610378	Precision Plus Protein Standard Plugs , unstained, 24 applications
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Clarity Western ECL Substrate

1705060	Clarity Western ECL Substrate , 200 ml
1705061	Clarity Western ECL Substrate , 500 ml

* Note that StrepTactin (-HRP or -AP) conjugate is needed for colorimetric or chemiluminescence blots.

Specialty Standards (IEF and 2-D SDS-PAGE)

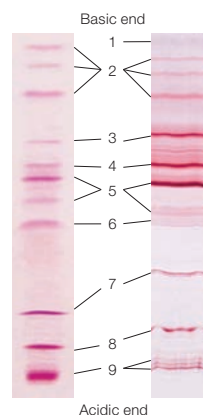
IEF Standards

IEF standards allow dependable and reproducible pI calibration in native polyacrylamide or agarose IEF gels. IEF standards are a mixture of nine native proteins with pIs ranging from 4.45–9.6. To monitor focusing, five of the nine proteins are naturally colored. The standards are provided in a stable aqueous solution and require no reconstitution or dilution prior to use.

Constituent Proteins of IEF Standards*

Protein	Color	pI
1. Cytochrome c	Red	9.6
2. Lentil lectin (3 bands)	—	7.8, 8.0, 8.2
3. Human hemoglobin C	Red	7.5
4. Human hemoglobin A	Red	7.1
5. Equine myoglobin (2 bands)	Brown	6.8, 7.0
6. Human carbonic anhydrase	—	6.5
7. Bovine carbonic anhydrase	—	6.0
8. β -lactoglobulin B	—	5.1
9. Phycocyanin (3 bands)	Blue	4.45, 4.65, 4.75

* Because the IEF standards are in native form, they cannot be used with reducing or denaturing agents such as urea, β -mercaptoethanol, or dithiothreitol. For calibration of IEF tube gels containing urea, use 2-D SDS-PAGE standards.



IEF standards stained with IEF gel stain. Run on Criterion Tris-HCl (left) and Ready Gel IEF gels (right).

Ordering Information

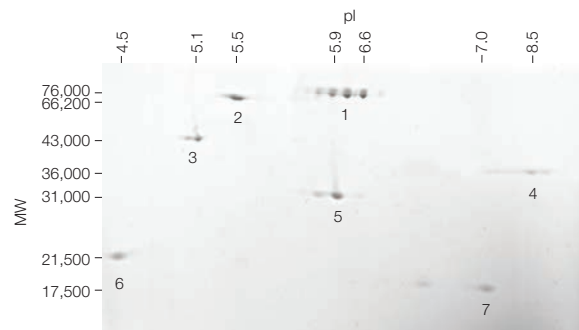
Catalog #	Description
1610310	IEF Standards, 250 μ l

2-D SDS-PAGE Standards

2-D SDS-PAGE protein standards provide calibrated references for the pI and MW of proteins in 2-D SDS-PAGE applications. These standards consist of seven reduced, denatured proteins that can be visualized with silver or Coomassie Blue stains and require no dilution prior to use.

Constituent Proteins of 2-D SDS-PAGE Standards

Protein	pI	MW, kD
1. Hen egg white conalbumin	6.0, 6.3, 6.6	76
2. Bovine serum albumin (BSA)	5.4, 5.5, 5.6	66
3. Bovine muscle actin	5.0, 5.1	43
4. Rabbit muscle GAPDH	8.3, 8.5	36
5. Bovine carbonic anhydrase	5.9, 6.0	31
6. Soybean trypsin inhibitor	4.5	21.5
7. Equine myoglobin	7.0	17.5



Migration pattern of 2-D SDS-PAGE standards. First dimension separation was performed with 7 cm ReadyStrip IPG strips. Second dimension separation was achieved with the Mini-PROTEAN II cell.

Ordering Information

Catalog #	Description
1610320	2-D SDS-PAGE Standards, 500 μ l

Mini-Format 1-D Electrophoresis Systems

The Mini-PROTEAN system includes the four-gel Mini-PROTEAN Tetra cell and the high-throughput, 12-gel Mini-PROTEAN 3 Dodeca cell. The systems are compatible with mini handcast or precast gels.

See Also

PowerPac Basic and PowerPac HC power supplies: page 187.

Premixed buffers: page 218.

Mini-PROTEAN precast gels: page 198.

Mini-PROTEAN Tetra Cell

The Mini-PROTEAN Tetra cell is ideal for vertical mini gel electrophoresis. This electrophoresis cell accommodates 1–4 precast or handcast gels. Easy to assemble, the Mini-PROTEAN Tetra cell has a patented sealing mechanism* that prevents assembly errors. The Mini-PROTEAN Tetra cell offers the following advantages:

Loading and Running

- Patented sample loading guides** prevent skipped or repeated loading lanes
- Cell runs up to four gels (10.0 x 8.3 cm) using two running modules

Modular Cells for Many Applications

- Interchangeable modules convert a Mini-PROTEAN Tetra cell into a Mini Trans-Blot electrophoresis transfer cell for western blotting

Gel Casting

- Ground glass plates with permanently bonded spacers and improved casting gaskets guarantee perfect alignment and leakproof casting
- Casting frames*** with simple cam closure provide precision alignment on any flat surface
- Side-by-side casting stand*** allows access to both gels simultaneously, and the spring-loaded lever creates a tight seal against the silicon rubber gasket
- Plastic combs*** do not inhibit polymerization and have built-in ridges to eliminate air contact during gel casting for uniform gel polymerization
- Glass plates and combs are labeled with thickness and number of wells for instant identification
- Thick glass spacer plates reduce breakage

Configuring Your Own Electrophoresis Cell

You can choose one of the preset configurations, such as #1658000 (10-well, 0.75 mm) or #1658001 (10-well, 1.0 mm). To configure your own electrophoresis cell, order the Mini-PROTEAN Tetra cell (#1658004) and select a casting module from the ordering information (see page 196).

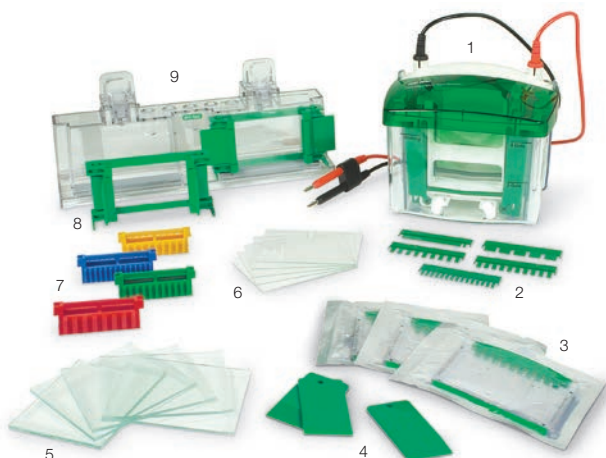
For More Information

Web: bio-rad.com/tetra

Request or download bulletin: 5535

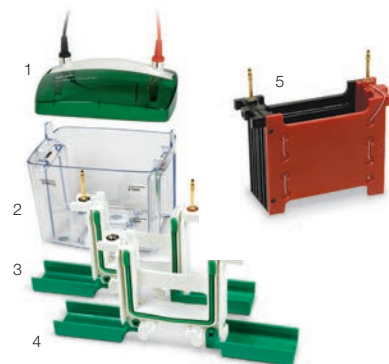
Mini-PROTEAN Tetra cell components:

- Lid and tank.
- Combs.
- Mini-PROTEAN TGX precast gels.
- Gel releasers.
- Spacer plates.
- Short plates.
- Sample loading guides.
- Casting frame.
- Casting stand.



Mini Trans-Blot electrophoresis transfer cell components:

- Lid.
- Tank.
- Electrode assembly.
- Companion running module.
- Mini Trans-Blot module.



*U.S. patents 6,436,262, **5,656,145, and ***6,162,342.

Maximum Sample Volume per Well for Mini-PROTEAN Tetra Combs

Number or Type of Wells	Well Width, mm	Comb Thickness		
		0.75 mm	1.0 mm	1.5 mm
5	12.70	70 µl	105 µl	160 µl
9	5.08	33 µl	44 µl	66 µl
10	5.08	33 µl	44 µl	66 µl
15	3.35	20 µl	26 µl	40 µl
IPG	6.20	—	420 µl	730 µl
Prep/2-D				
Reference well	3.10	13 µl	17 µl	30 µl
Sample well	67.44	310 µl	400 µl	680 µl

Specifications

Number of gels	1–4	Total buffer volume for 2 gels	700 ml
Precast gels	Mini-PROTEAN	Total buffer volume for 4 gels	1,000 ml
Handcast gels	Cast using Mini-PROTEAN spacer plates	Typical run times for SDS-PAGE	35–45 min (at 200 V constant)
Cassette size (W x L)	Precast: 10.0 x 8.3 cm	Recommended power supply	See Power Supply Selection Guide, p. 185
Glass plate size (W x L)	Short plate: 10.1 x 7.3 cm Spacer plate: 10.1 x 8.2 cm	Dimensions (W x L x H)	12.0 x 16.0 x 18.0 cm
		Weight	1 kg (2.2 lb)

Ordering Information

Catalog #	Description
1658000FC	Mini-PROTEAN Tetra Cell , 10-well, 0.75 mm thickness; 4-gel system includes 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), 2 casting stands, 4 casting frames, sample loading guide, electrode assembly, companion running module, tank, lid with power cables, mini cell buffer dam
1658001FC	Mini-PROTEAN Tetra Cell , 10-well, 1.0 mm thickness; 4-gel system includes 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), 2 casting stands, 4 casting frames, sample loading guide, electrode assembly, companion running module, tank, lid with power cables, mini cell buffer dam
1658002FC*	Mini-PROTEAN Tetra Cell , 10-well, 0.75 mm thickness; 2-gel system includes 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), casting stand, 2 casting frames, sample loading guide, electrode assembly, tank, lid with power cables, mini cell buffer dam
1658003FC*	Mini-PROTEAN Tetra Cell , 10-well, 1.0 mm thickness; 2-gel system includes 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), casting stand, 2 casting frames, sample loading guide, electrode assembly, tank, lid with power cables, mini cell buffer dam
1658004	Mini-PROTEAN Tetra Cell for Mini Precast Gels , 4-gel system includes electrode assembly, companion running module, tank, lid with power cables, mini cell buffer dam
1658005*	Mini-PROTEAN Tetra Cell for Mini Precast Gels , 2-gel system includes electrode assembly, tank, lid with power cables, mini cell buffer dam
1658006FC	Mini-PROTEAN Tetra Cell , 10-well, 1.5 mm thickness; 4-gel system includes 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), 2 casting stands, 4 casting frames, sample loading guide, electrode assembly, companion running module, tank, lid with power cables, mini cell buffer dam
1658007FC*	Mini-PROTEAN Tetra Cell , 10-well, 1.5 mm thickness; 2-gel system includes 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), casting stand, 2 casting frames, sample loading guide, electrode assembly, tank, lid with power cables, mini cell buffer dam

Mini-PROTEAN Tetra Systems

1658025FC	Mini-PROTEAN Tetra Cell and PowerPac Basic Power Supply , includes #1658001 and #1645050
1658026FC	Mini-PROTEAN Tetra Cell and PowerPac Universal Power Supply , includes #1658001 and #1645070
1658027FC	Mini-PROTEAN Tetra Cell and PowerPac HC Power Supply , includes #1658001 and #1645052
1658028FC	Mini-PROTEAN Tetra Cell and PowerPac HV Power Supply , includes #1658001 and #1645056
1658029FC	Mini-PROTEAN Tetra Cell and Mini Trans-Blot Module , includes #1658001 and #1703935
1658030	Mini-PROTEAN Tetra Cell for Mini Precast Gels and Mini Trans-Blot Module , includes #1658004 and #1703935
1658033FC	Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac Basic Power Supply , includes #1658001, #1703935, and #1645050
1658034FC	Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac Basic Power Supply , includes #1658004, #1703935, and #1645050
1658035FC	Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac HC Power Supply , includes #1658001, #1703935, and #1645052
1658036	Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac HC Power Supply , includes #1658004, #1703935, and #1645052

continues

The catalog numbers above with an "FC" suffix come with a 10% TGX Stain-Free FastCast kit (1610182). To place an order without a FastCast kit, remove the "FC" suffix from the catalog number.

Ordering Information

Description	0.75 mm	1.0 mm	1.5 mm
Casting Modules**			
5-Well	1658008	1658013	1658019
9-Well	1658009	1658014	1658020
10-Well	1658010	1658015	1658021
15-Well	1658011	1658016	1658022
Prep/2-D Well	1658012	1658017	1658023
IPG Well	—	1658018	1658024
Mini-PROTEAN Combs (5) for Hand Casting with Glass Plates			
5-Well	1653352	1653357	1653363
9-Well	1653353	1653358	1653364
10-Well	1653354	1653359	1653365
15-Well	1653355	1653360	1653366
Prep/2-D + 1 Reference Well	1653356	1653361	1653367
IPG Well	—	1653362	1653368

Catalog #	Description
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Handcast Gel Accessories and Replacement Parts

1658051	Mini-PROTEAN Tetra Cell Casting Stand , 2 core, includes clamps for use with the Mini-PROTEAN Tetra cell casting modules
1658052	Mini-PROTEAN Tetra Cell Casting Stand , 1 core, includes clamps for use with the Mini-PROTEAN Tetra cell casting modules
1653303	Mini-PROTEAN Casting Stand with Gaskets
1653304	Mini-PROTEAN Casting Frame
1653305	Mini-PROTEAN Casting Stand Gaskets , replacement, 2
1653308	Short Plates , 5
1653149	Replacement Gaskets , for electrophoresis clamping frame, green, 2
1653310	Spacer Plates with 0.75 mm Integrated Spacers , 5
1653311	Spacer Plates with 1.0 mm Integrated Spacers , 5
1653312	Spacer Plates with 1.5 mm Integrated Spacers , 5

Other Replacement Parts and Accessories

1658037	Mini-PROTEAN Tetra Electrode Assembly
1658038	Mini-PROTEAN Tetra Companion Running Module
1658039	Buffer Tank , replacement
1658040	Buffer Tank and Lid , replacement
1658041	Cell Lid with Power Cables
1653201	Sample Loading Guide , 9-well (red)
1653146	Sample Loading Guide , 10-well (yellow)
1653203	Sample Loading Guide , 12-well (green)
1653132	Sample Loading Guide , 15-well (blue)
1653130	Mini Cell Buffer Dams , 2 (compatible with Mini-PROTEAN Tetra cell, Mini-PROTEAN 3 Dodeca cell, and the discontinued Mini-PROTEAN 3 cell)
1653320	Gel Releasers , 5

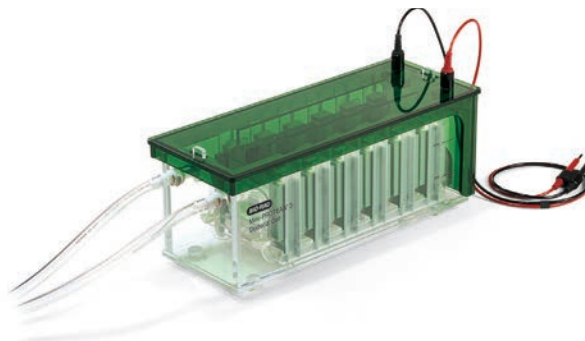
* The 2-gel systems do not include the companion running module.

** Each casting module includes 2 casting stands, 4 casting frames, 5 combs, 1 set of glass plates (5 short plates and 5 spacer plates), and the appropriate sample loading guide.

Mini-PROTEAN 3 Dodeca Cell

The Mini-PROTEAN 3 Dodeca cell runs up to 12 mini gels under identical conditions in just 35 minutes. Eliminate gel-to-gel variation by hand casting gels 12 at a time using the Mini-PROTEAN 3 multi-casting chamber (see page 202) and Model 485 gradient former (see page 202). Alternatively, use precast gels. Features of the Mini-PROTEAN 3 Dodeca cell include:

- Built-in cooling coil to prevent overheating
- Stirbar capability helps maintain uniform buffer tank temperatures for run reproducibility
- Easy assembly facilitated by a patented* electrophoresis clamping frame
- Convenient buffer draining via the built-in quick-connect drain port



For More Information
 Web: bio-rad.com/dodeca
 Download bulletin: 2571

See Also

PowerPac HC power supply: page 187.
 Mini-PROTEAN precast gels: page 198.
 AnyGel stands: page 201.

Specifications

Number of gels	1–12
Precast gels	Mini-PROTEAN
Handcast gels	Cast using Mini-PROTEAN 3 spacer plates and the Mini-PROTEAN 3 multi-casting chamber
Cassette size (W x L)	10.0 x 8.3 cm
Gel thickness	0.5, 0.75, 1.0, or 1.5 mm (precast gels are available only in 1.0 mm)
Total buffer volume	3.4–4.4 L
Typical running conditions	200 V constant, 600 mA, 120 W maximum
Cooling	Built-in cooling coil attaches easily to external refrigerated circulator (circulator must be purchased separately; recommended flow rate 10–15 L/min, recommended cooling capacity ≥250 W at 20°C)
Recommended power supply	PowerPac HC
Dimensions (W x L x H)	16.2 x 41.5 x 15.0 cm
Weight	5 kg (11 lb)

* U.S. patent 6,436,262.

Ordering Information

Catalog #	Description
1654100	Mini-PROTEAN 3 Dodeca Cell , includes electrophoresis tank with built-in cooling coil, lid with power cables, 6 electrophoresis clamping frames, 2 buffer dams, drain line, 2 gel releasers
1654101	Mini-PROTEAN 3 Dodeca Cell with Multi-Casting Chamber , same as #1654100 with multi-casting chamber, 15 separation sheets, 8 acrylic blocks, tapered luer connector, stopcock valve
1655132	Mini-PROTEAN 3 Dodeca Cell and 6-Row AnyGel Stand , includes #1654100 and #1655131

Replacement Parts and Accessories

1654102	Replacement Electrophoresis Clamping Frame
1653149	Replacement Gaskets , for electrophoresis clamping frame, green, 2
1654103	Lower Electrode Assembly with Platinum Wire
1654104	Replacement Drain Line
1654105	Replacement Cooling Coil , includes connector tubing
1652948	Replacement Power Cables , for lid
1653320	Gel Releasers , 5
1653130	Mini Cell Buffer Dams , 2 (compatible with Mini-PROTEAN Tetra cell, Mini-PROTEAN 3 Dodeca cell, and the discontinued Mini-PROTEAN 3 cell)
1655131	AnyGel Stand , 6-row, holds 6 PROTEAN gels, 12 Criterion gels, or 18 Mini-PROTEAN gels

Mini-PROTEAN Precast Gels

Mini-PROTEAN TGX Precast Gels

Long shelf life Mini-PROTEAN TGX precast gels accelerate electrophoresis and blotting while delivering superior performance. TGX gels maintain cooler temperatures at high voltages, allowing run times as short as 15 minutes. The gels are designed to provide Laemmli-like separation patterns using the standard Tris/glycine/SDS running buffer system. Mini-PROTEAN gels are compatible with the Mini-PROTEAN Tetra (1–4 gels) and Dodeca (1–12 gels) cells. These gels can also be used in the earlier Mini-PROTEAN 3 cell model. Gel opening lever (4560000) sold separately.

Mini-PROTEAN TGX gels provide:

- Run times as short as 15 min
- Transfer times as short as 3 min with the Trans Blot Turbo transfer system
- 12-month shelf life
- Laemmli format
- Inexpensive buffer system, low running costs
- Bottom-open cassette design for simple gel handling and blotting

For More Information

Web: bio-rad.com/tgx

Request or download bulletins: 5535 and 5871

Mini-PROTEAN TGX Stain-Free Precast Gels

Mini-PROTEAN TGX Stain-Free precast gels combine TGX formulation with a proprietary compound that facilitates protein visualization in less than 5 minutes using Bio-Rad's stain-free enabled imaging systems (see page 298).

Mini-PROTEAN TGX Stain-Free precast gels eliminate the need for staining, reducing the time to results and improving the ease of downstream processing. In addition to the 12-month shelf life, Laemmli buffer system, and fast run times of the TGX formulation, the Mini-PROTEAN TGX Stain-Free gels provide:

- Complete protein separation, gel imaging, and data analysis in 20 min
- Sensitivity comparable to that of Coomassie stain
- Better reproducibility and quantitation compared to staining procedures
- Capability of using the same gel for chromatography, western blotting, standard staining methods, and mass spectrometry analysis

For More Information

Web: bio-rad.com/ministainfree



Empty Cassettes for Hand Casting

Single-use empty Mini-PROTEAN cassettes are available to hand cast gels. For added convenience, cast your gels using AnyGel stands or the Mini-PROTEAN casting stand.

Mini-PROTEAN Gels

Mini-PROTEAN Tris-Tricine Precast Gels

- Designed for separation of peptides and small proteins with MWs <10,000

Mini-PROTEAN TBE and TBE-Urea Precast Gels

- Ideal for the separation of DNA and RNA
- TBE gels are suitable for electrophoresis of nucleic acids from 50–2,000 bp
- TBE-urea gels are best suited for the separation of ssDNA and ssRNA from 60 to 200 bp

For More Information

Web: bio-rad.com/mpgels

Gel Cassette Specifications

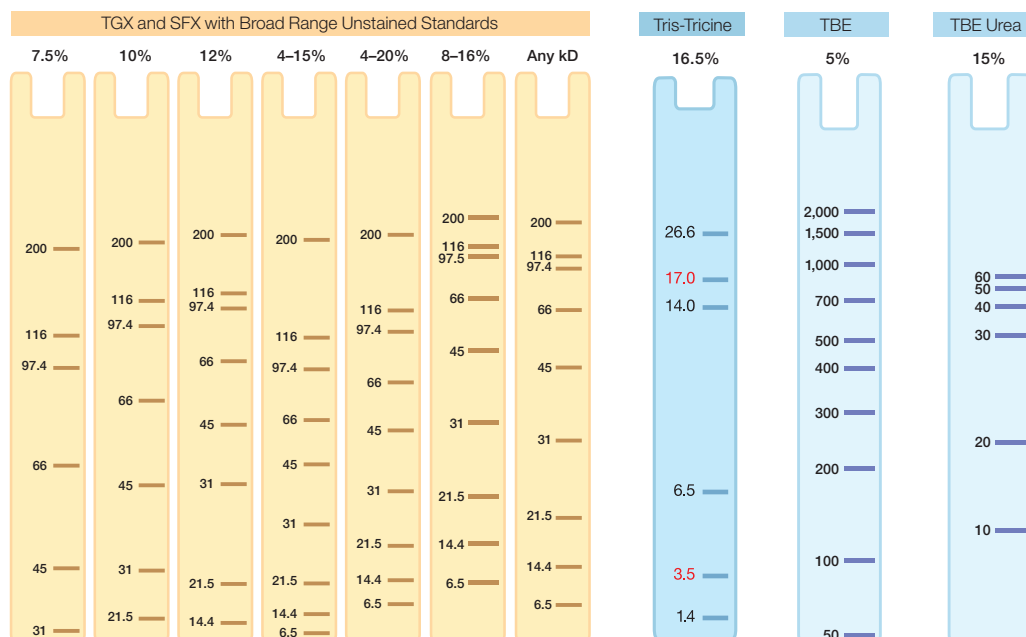
Gel dimensions (W x L x thickness)	86.0 x 72.0 x 1.0 mm
Gel cassette dimensions (W x L x thickness)	101.0 x 89.0 x 4.6 mm
Cassette material	Styrene copolymer
Comb material	Polycarbonate
Gel storage conditions	Store flat at 4°C; do not freeze

Mini-PROTEAN Precast Gel Selection Guide






	TGX, TGX Stain-Free	Tris-Tricine	TBE, TBE-Urea
Shelf Life at Recommended Temperature*	12 months	8–12 weeks	8–12 weeks
Recommended Buffers			
Sample (dilute 1:1 with sample)	Laemmli	Tricine	Nucleic acid, TBE-urea
Running	Tris/glycine/SDS	Tris/Tricine/SDS	Tris/boric acid/EDTA (TBE)

* From date of manufacture.

Mini-PROTEAN Precast Gel Migration Charts



Ordering Information

Description					
	10-Well* 30 µl	10-Well 50 µl	12-Well 20 µl	15-Well 15 µl	IPG Well† 7 cm IPG Strip
Mini-PROTEAN TGX Precast Gels					
7.5% Resolving Gel	4561023**	4561024**	4561025**	4561026**	4561021
10% Resolving Gel	4561033**	4561034**	4561035**	4561036**	4561031
12% Resolving Gel	4561043**	4561044**	4561045**	4561046**	4561041
4–15% Resolving Gel	4561083**	4561084**	4561085**	4561086**	4561081
4–20% Resolving Gel	4561093**	4561094**	4561095**	4561096**	4561091
8–16% Resolving Gel	4561103	4561104	4561105	4561106	4561101
Any kD Resolving Gel	4569033**	4569034**	4569035**	4569036**	4569031
Mini-PROTEAN TGX Stain-Free Precast Gels					
7.5% Resolving Gel	4568023	4568024	4568025	4568026	4568021
10% Resolving Gel	4568033	4568034	4568035	4568036	4568031
12% Resolving Gel	4568043	4568044	4568045	4568046	4568041
4–15% Resolving Gel	4568083	4568084	4568085	4568086	4568081
4–20% Resolving Gel	4568093	4568094	4568095	4568096	4568091
8–16% Resolving Gel	4568103	4568104	4568105	4568106	4568101
Any kD Resolving Gel	4568123	4568124	4568125	4568126	4568121
Empty Cassettes and Combs					
Mini-PROTEAN Empty Cassette***	4560003	—	4560005	—	—
Combs (for Mini-PROTEAN empty cassettes)	4560013	—	4560015	—	—

* Multichannel pipet compatible.

** Mini-PROTEAN TGX gels are available with 100 µl of dual color standard (add DC to the end of the catalog number listed).

*** Includes 50 empty cassettes. Combs sold separately in 50 pack.





† IPG well only, no reference well. If a protein standard is needed on gel, order Precision Plus Protein Standard plugs, #1610378.

Catalog #	Description
4560000	Mini-PROTEAN Precast Gel Opening Lever
Premixed Buffers for Mini-PROTEAN TGX Gels*	
1610737	2x Laemmli Sample Buffer, 30 ml
1610747	4x Laemmli Sample Buffer, 10 ml
1610738	2x Native Sample Buffer, 30 ml
1610732	10x Tris/Glycine/SDS, 1 L
1610734	10x Tris/Glycine, 1 L

* For 5 L volume of the running buffers, see page 219.

Applications Guide

1658100	Mini-PROTEAN Gel Instruction Manual and Application Guide, online
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Description				
	10-Well 30 µl	10-Well 50 µl	12-Well* 20 µl	15-Well 15 µl
Mini-PROTEAN Precast Gels (2 per package)				
5% TBE	4565013	4565014*	4565015*	4565016
15% TBE-Urea	4566053*	—	4566055*	4566056*
16.5% Tris-Tricine	4563063	4563064	4563065*	4563066

* Please allow up to 2 weeks for delivery.

continues

Ordering Information

Catalog #	Description
Premixed Buffers for Tris-HCl Gels	
1610737	2x Laemmli Sample Buffer, 30 ml
1610747	4x Laemmli Sample Buffer, 10 ml
1610738	2x Native Sample Buffer, 30 ml
1610732	10x Tris/Glycine/SDS, 1 L
1610734	10x Tris/Glycine, 1 L
1610772	10x Tris/Glycine/SDS, 5 L cube
1610771	10x Tris/Glycine, 5 L cube
Premixed Buffers for Tris-Tricine Gels for Peptides	
1610739	2x Tricine Sample Buffer, 30 ml
1610744	10x Tris/Tricine/SDS, 1 L
Premixed Buffers for IEF Gels	
1610763	IEF Sample Buffer, 30 ml
1610761	10x IEF Anode Buffer, 250 ml
1610762	10x IEF Cathode Buffer, 250 ml

Mini-PROTEAN Hand Casting Accessories

Empty Cassettes

Single-use empty Mini-PROTEAN cassettes are available for hand casting a mini gel.

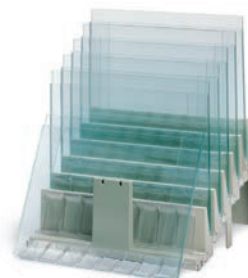
AnyGel Stands

AnyGel stands are convenient for storing glass plates of any size gel. They are available as single row or six-row stands.

Features of the six-row stand:

- Perfect for high-volume 2-D proteomics studies — accommodates up to 6 PROTEAN, 12 Criterion, or 18 Mini-PROTEAN mini gels
- Facilitates loading IPG strips on both large-format gels and Criterion gel sizes using a front clamp that slants the gel to an ideal angle (can also be used to load tube gels)
- A stair-step design and clear clamps so gels are clearly visible while casting and loading

The single-row AnyGel stand is ideal for processing a few gels at a time. It accommodates one PROTEAN gel, two Criterion gels, or three Mini-PROTEAN mini gels.



AnyGel Six-Row Stand



AnyGel Single-Row Stand with Mini-PROTEAN Cassettes

See Also

Acrylamide gel-casting reagents: page 221.
Premixed buffers: page 218.

Mini-PROTEAN 3 Multi-Casting Chamber

Use the Mini-PROTEAN 3 multi-casting chamber to cast up to 12 gels of 0.75, 1.0, or 1.5 mm thickness simultaneously. Acrylic blocks act as space fillers when fewer than 12 gels are cast. You can cast gradient gels through a bottom filling port with the Model 485 gradient former to ensure reproducibility. Gels cast in the multi-casting chamber can be run on any of the Mini-PROTEAN electrophoresis systems including the Mini-PROTEAN Tetra cell and the Mini-PROTEAN 3 Dodeca cell.



Mini-PROTEAN 3 Multi-Casting Chamber

For More Information

Web: bio-rad.com/mphandcast

Ordering Information

Catalog #	Description
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Mini-PROTEAN Empty Cassettes and Combs

4560003	Mini-PROTEAN Empty Cassettes, 10-well, 50
4560005	Mini-PROTEAN Empty Cassettes, 12-well, 50
4560013	Mini-PROTEAN Combs, 10-well, 50
4560015	Mini-PROTEAN Combs, 12-well, 50

AnyGel Stands and Accessories

1654131	AnyGel Stand, single-row, holds 1 PROTEAN gel, 2 Criterion gels, or 3 Mini-PROTEAN gels
1655131	AnyGel Stand, 6-row, holds 6 PROTEAN gels, 12 Criterion gels, or 18 Mini-PROTEAN gels
1654132	Replacement Clamps, 2

AnyGel Stands and Electrophoresis Cells

1655133	Criterion Dodeca Cell and 6-Row AnyGel Stand, includes #1654130 and #1655131
1656020	Criterion Cell and Single-Row AnyGel Stand, includes #1656001 and #1654131

Mini-PROTEAN 3 Multi-Casting Chambers

1654110*	Mini-PROTEAN 3 Multi-Casting Chamber, includes 15 separation sheets, 8 acrylic blocks, tapered luer connector, stopcock valve (order glass plates and combs separately)
1654111*	Mini-PROTEAN 3 Multi-Casting Chamber, 0.75 mm, includes 15 sets of glass plates
1654112*	Mini-PROTEAN 3 Multi-Casting Chamber, 1.0 mm, includes 15 sets of glass plates
1654113*	Mini-PROTEAN 3 Multi-Casting Chamber, 1.5 mm, includes 15 sets of glass plates

Mini-PROTEAN 3 Multi-Casting Chamber Accessories

1654114	Acrylic Blocks, 6.0 mm, 8
1654115	Separation Sheets, 15
1653320	Gel Releasers, 5
1652913	Replacement Gaskets, for Mini-PROTEAN 3 multi-casting chamber, includes 3' of tubing

Combs* and Glass Plates for 2-D Electrophoresis**

1653308	Short Plates, 5
1653310	Spacer Plates with 0.75 mm Integrated Spacers, 5
1653311	Spacer Plates with 1.0 mm Integrated Spacers, 5
1653312	Spacer Plates with 1.5 mm Integrated Spacers, 5
1653362	Mini-PROTEAN Comb, IPG well, 1.0 mm
1653368	Mini-PROTEAN Comb, IPG well, 1.5 mm
1653356	Mini-PROTEAN Comb, prep/2-D well, 0.75 mm
1653361	Mini-PROTEAN Comb, prep/2-D well, 1.0 mm
1653367	Mini-PROTEAN Comb, prep/2-D well, 1.5 mm

Model 485 Gradient Former Accessories

1652006	Exponential Piston, for Model 385 and Model 485 gradient formers
1652007	Gradient Pouring Needles, 2
1652008	Tubing Connection Kit, includes stopcock, luer taper coupling, tubing (1/8" ID, 3'), Y-connector

* Order combs separately (see combs for use with glass plates on page 196) in the Mini-PROTEAN Tetra cell section.

** For multi-well comb configurations, refer to page 196.

Midi-Format 1-D Electrophoresis Systems

The Criterion and the Criterion Dodeca electrophoresis cells accommodate precast or handcast Criterion gels that are wider and longer than traditional mini gels for increased throughput and separation.

Criterion Cell and Criterion Dodeca Cell

Criterion Cell

The Criterion electrophoresis cell is dedicated to running one or two midi gels (13.3 x 8.7 cm), which are wider and longer than traditional mini gels (8.6 x 7.2 cm). With a single Criterion gel, you can run up to 26 samples in less than 1 hour or accommodate 11 cm ReadyStrip IPG strips for 2-D applications.

- Compact size that requires only 1 L of running buffer
- Built-in wedge on the lid to open gel cassettes in a single step
- Locator slots built into the tank walls to easily and quickly slide cassettes* into position

For More Information

Web: bio-rad.com/criterioncell

Download bulletin: 2710

* U.S. patent 6,093,301.

Criterion Dodeca Cell

The Criterion Dodeca cell has the capacity to run up to 12 handcast or Criterion precast gels simultaneously. Criterion gels accommodate 11 cm ReadyStrip IPG strips.

- Locator slots to slide cassettes* into place without alignment hassles or bulky clamps
- Built-in cooling coil to prevent overheating and ensure the highest resolution
- Stirbar capability to maintain uniform buffer tank temperatures for reproducible runs
- A cassette opener built into the cell for easy gel access
- Convenient buffer draining via the built-in quick-connect drain port

* U.S. patent 6,093,301.



For More Information

Web: bio-rad.com/criteriondodeca

Download bulletin: 2622

See Also

Criterion precast gels and empty cassettes: pages 204, 209.

Criterion blotter: page 244.

PowerPac Basic and PowerPac HC power supplies: page 187.

Dodeca stainers: pages 209, 216.

AnyGel stands: page 201.

Imaging systems: page 298.

Imaging software: page 303.

Specifications	Criterion Cell	Criterion Dodeca Cell
Number of gels	1-2	1-12
Precast gels	Criterion precast gels	Criterion precast gels
Handcast gels	Gels prepared in Criterion empty cassettes	Gels prepared in Criterion empty cassettes
Gel size (W x L)	13.3 x 8.7 cm	13.3 x 8.7 cm
Gel thickness	1.0 mm	1.0 mm
Total buffer volume	1 L	6 L
Typical running conditions	200 V constant	200 V constant; 1 A maximum; 200 W maximum
Recommended power supply	PowerPac Basic or PowerPac HC	PowerPac HC or PowerPac Universal
Dimensions (W x L x H)	14.4 x 22.3 x 19.5 cm	18.8 x 49.0 x 19.2 cm
Weight	0.86 kg (1.9 lb)	4.8 kg (11 lb)

Ordering Information

Catalog # Description

Criterion Cell and Systems

1656001	Criterion Cell , includes electrophoresis buffer tank, lid with power cables, 3 sample loading guides (12+2 well, 18-well, 26-well)
1656019	Criterion Cell and PowerPac Basic Power Supply , 100–120/220–240 V, includes #1656001 and #1645050
1656020	Criterion Cell and Single-Row AnyGel Stand , includes #1656001 and #1654131

Replacement Parts

1656002	Criterion Replacement Electrophoresis Buffer Tank , with lower electrodes
1656003	Criterion Replacement Lid , with upper electrodes
1656004	Criterion Replacement Upper Electrode , includes prestrung platinum wire
1656005	Criterion Replacement Lower Electrode , includes prestrung platinum wire
1652948	Replacement Power Cables , for lid
1654131	AnyGel Stand , single-row, holds 1 PROTEAN gel, 2 Criterion gels, or 3 Mini-PROTEAN gels

Criterion Dodeca Cell

1654130	Criterion Dodeca Cell , includes electrophoresis buffer tank with built-in cooling coil, lid with power cables
1654138	Criterion Dodeca Cell and PowerPac HC Power Supply , includes #1654130 and #1645052
1654139	Criterion Dodeca Cell and PowerPac Universal Power Supply , includes #1654130 and #1645070
1655133	Criterion Dodeca Cell and 6-Row AnyGel Stand , includes #1654130 and #1655131

Replacement Parts

1654104	Replacement Drain Line
1654135	Lower Electrode with Platinum Wire
1654136	Replacement Cooling Coil , includes connector tubing
1654137	Replacement Lid
1652948	Replacement Power Cables , for lid

See Also

Premixed buffers: page 218.
 ReadyStrip IPG strips: page 230.
 Criterion blotter: page 244.
 PowerPac power supplies: page 185.
 Dodeca stainers: pages 209, 216.
 Criterion staining trays: page 209.
 Standards: page 189.
 Protein electrophoresis stains: page 225.

Criterion Precast Gels

Criterion precast gels include a broad selection of midi polyacrylamide gels in single-use cassettes. This gel size provides reproducible, high-resolution results with fast setup, loading, and run times. The gels are wider and longer than traditional mini gels for high-throughput electrophoresis. Criterion gels are packaged and sold in individual units: 1–2 gels can be run in the Criterion cell (page 203) and 1–12 gels can be run in the high-throughput Criterion Dodeca cell (page 203).

- Fast run times and 12-month shelf life for Criterion TGX gels
- Room temperature storage and 12-month shelf life for Criterion XT Bis-Tris gels
- Formats that run up to 26 samples on a single gel without reducing sample volume or sacrificing speed
- A patented* cassette design including an integral upper buffer chamber that never leaks and requires no tools to open
- Sample wells that are outlined and numbered for easy loading
- Multichannel pipet-compatible combs



Criterion TGX Precast Gels

These precast gels use the Laemmli buffer system and have a 12-month shelf life. And they maintain cooler temperatures at elevated voltages, allowing for reduced run times.

- Run times as short as 20 min
- Transfer times as short as 7 min with the Trans-Blot Turbo system
- 12-month shelf life
- Laemmli format, no special buffers required
- Integrated upper buffer chamber

Criterion TGX Precast Gel Specifications

Gel dimensions (W x L)	13.3 x 8.7 cm; 1.0 mm thick
Cassette dimensions (W x L)	15.0 x 10.6 cm; 5.3 mm thick
Cassette material	Styrene copolymer
Comb material	Polycarbonate
Gel storage conditions	Store flat at 4°C; do not freeze
Shelf life at recommended temperature	12 months (from date of manufacture)
Recommended sample buffer (dilute 1:1 with sample)	Laemmli sample buffer: 62.5 mM Tris-HCl, pH 6.8, 2% SDS, 25% glycerol, 0.01% bromophenol blue
Recommended running buffer (Tris/glycine/SDS)	25 mM Tris, 192 mM glycine, 0.1% SDS, pH 8.3
Run times	42–50 min at 200 V 20–26 min at 300 V

Available Chemistries

IEF	pH 3–10, 5–8
TBE	5%
TBE-urea	5%, 10%, 15%
TGX	7.5%, 10%, 12% resolving 4–15%, 4–20%, 8–16% linear gradient Any kD
TGX Stain-Free	7.5%, 10%, 12%, 4–15%, 4–20% 8–16% linear gradient Any kD
Tris-acetate	3–8% resolving
Tris-HCl	10%, 12.5%, 15%, 4–15%, 4–20%, 10–20%
Tris-Tricine	16.5%
XT (Bis-Tris)	10%, 12%, 4–12% resolving

* U.S. patent 6,093,301.



Criterion TGX Stain-Free Precast Gels

Criterion TGX Stain-Free precast gels combine TGX formulation with a proprietary compound that facilitates protein visualization in less than 5 minutes using Bio-Rad's stain-free enabled imaging systems (see page 298).

Criterion TGX Stain-Free precast gels eliminate the need for staining. In addition to the 12-month shelf life, Laemmli buffer system, and fast run times of the TGX formulation, the Criterion TGX Stain-Free gels provide:

- Complete protein separation, gel imaging, and data analysis in 25 min
- Comparable sensitivity to Coomassie stain
- Better reproducibility and quantitation compared to staining procedures
- Use of the same gel for chromatography, western blotting, standard staining methods, and mass spectrometry analysis

For More Information

Web: bio-rad.com/midistainfree

Download bulletin: 5974

Extended Shelf-Life Criterion XT Gels for SDS-PAGE and Native PAGE

Criterion XT gels are formulated at near-neutral pH to ensure longer shelf life (12 months for Bis-Tris gels, 8 months for Tris-acetate gels) and improved protein stability. Criterion XT gels are run using optimized sample and running buffers — without the need for antioxidant addition — for sharp bands and minimal preparation time. Like traditional Laemmli systems, Criterion XT gels use discontinuous buffer that forms moving boundaries to stack and then separate proteins.

Criterion XT Bis-Tris gels are formulated by using a Bis-Tris buffer system (pH 6.4) for separation of proteins by MW. By selecting from two running buffers (MOPS or MES) you can expand the separation capability of a single Bis-Tris gel type.

For More Information

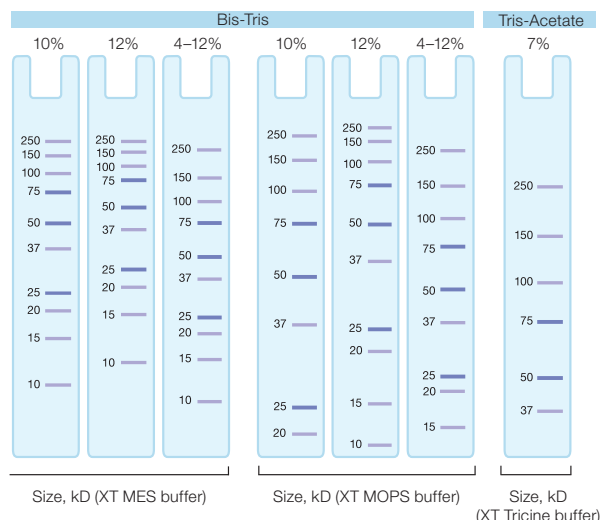
Web: bio-rad.com/criteriongels

Specifications

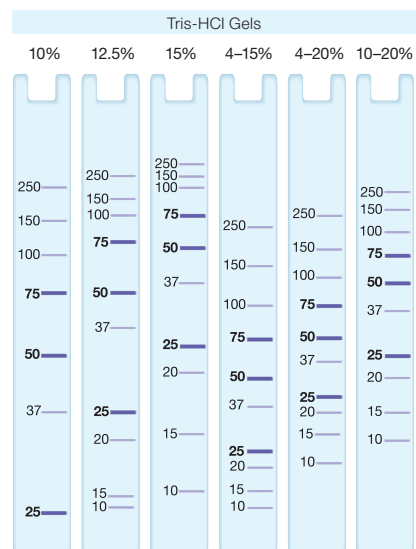
Gel dimensions	13.3 x 8.7 cm (W x L); 1.0 mm thick
Cassette dimensions	15.0 x 10.6 cm (W x L); 5.3 mm thick
Cassette material	Styrene copolymer
Comb material	Polycarbonate
Storage tray material	PET
Gel storage conditions	Store flat; do not freeze Room temperature for Bis-Tris gels 4°C for all other gel types
Gel shelf life*	12 months for TGX and Bis-Tris gels 8 months for Tris-acetate gels 12 weeks for Tris-HCl, Tris-Tricine, TBE, TBE-urea gels 26 weeks for IEF gels
Buffer volume	Upper, 60 ml; lower, 400 ml

* From date of manufacture.

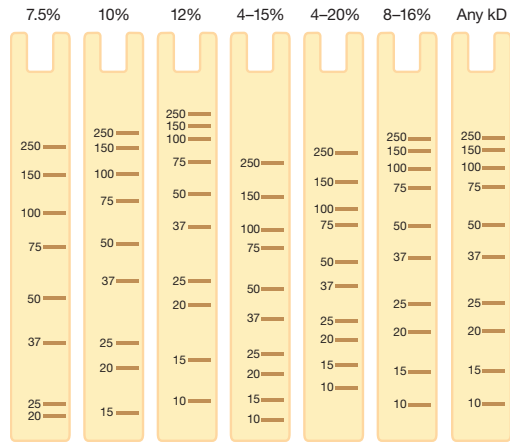
Criterion XT Migration Charts (with Precision Plus Protein Unstained Standards)



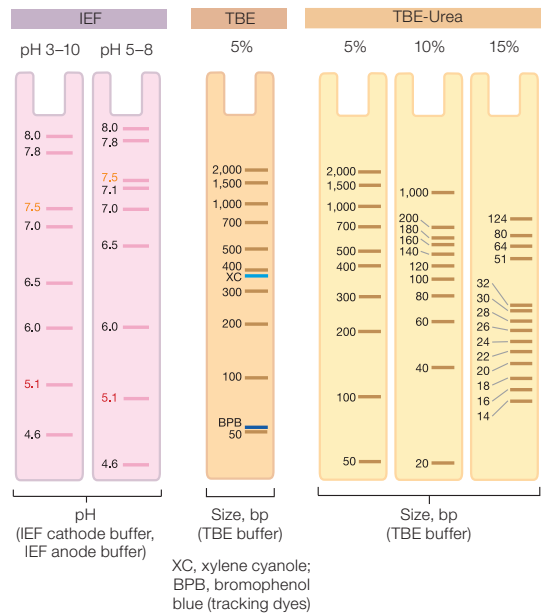
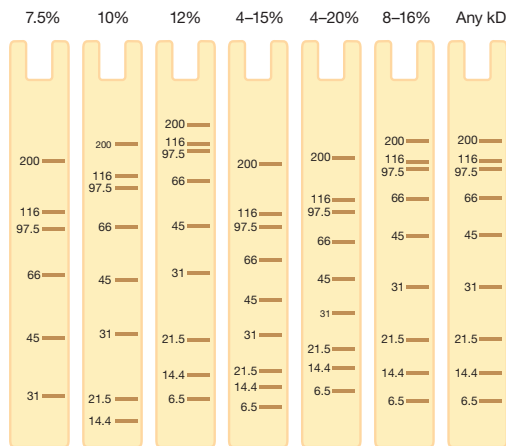
Criterion Migration Charts (with Precision Plus Protein Unstained Standards)



Criterion TGX and TGX Stain-Free Migration Charts (with Precision Plus Protein Unstained Standards)



Criterion TGX and TGX Stain-Free Migration Charts (with Broad Range Unstained Protein Standards)




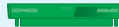



Protein Electrophoresis

Midi-Format 1-D Electrophoresis Systems

bio-rad.com/midielectro

Ordering Information

Description					
	12+2-Well*** 45 µl	18-Well 50 µl	26-Well* 15 µl	Prep+2-Well** 800 µl	IPG+1-Well** 11 cm IPG Strip
Criterion TGX Precast Gels					
7.5% Resolving Gel	5671023	5671024	5671025	—	—
10% Resolving Gel	5671033	5671034	5671035	—	—
12% Resolving Gel	5671043	5671044	5671045	—	—
4–15% Linear Gradient	5671083	5671084	5671085	5671082	5671081
4–20% Linear Gradient	5671093	5671094	5671095	5671092	5671091
8–16% Linear Gradient	5671103	5671104	5671105	5671102	5671101
Any kD Gel	5671123	5671124	5671125	5671122	5671121
Criterion TGX Stain-Free Precast Gels					
7.5% Gel	5678023	5678024	5678025	—	—
10% Gel	5678033	5678034	5678035	—	—
12% Gel	5678043	5678044	5678045	—	—
4–15% Gel	5678083	5678084	5678085	5678082	5678081
4–20% Gel	5678093	5678094	5678095	5678092	5678091
8–16% Linear Gradient	5678103	5678104	5678105	5678102	5678101
Any kD Gel	5678123	5678124	5678125	5678122	5678121
Criterion XT Bis-Tris Gels***					
10% Resolving Gel	3450111	3450112	3450113	—	3450115
12% Resolving Gel	3450117	3450118	3450119	3450120†	3450121
4–12% Resolving Gel	3450123	3450124	3450125	3450126†	3450127
Criterion XT Tris-Acetate Gels					
3–8% Resolving Gel	3450129	3450130	3450131	—	—
Criterion Tris-HCl Gels					
10% Resolving Gel	3450009	3450010	3450011	—	3450101
12.5% Resolving Gel	3450014	3450015	3450016	3450017†	3450102
15% Resolving Gel	3450019	3450020	3450021	—	—
4–15% Linear Gradient	3450027	3450028	3450029	—	—
4–20% Linear Gradient	3450032	3450033	3450034	—	3450104
10–20% Linear Gradient	3450042	3450043	3450044	—	3450107
Criterion Tris-Tricine Gels					
16.5% Tris-Tricine	3450063	3450064	3450065†	—	—
Criterion IEF Gels					
pH 3–10	3450071†	3450072†	—	—	—
pH 5–8	—	3450076†	—	—	—
Criterion TBE Gels					
5% TBE Gel	3450047	3450048	3450049	—	—
Criterion TBE-Urea Gels					
5% TBE-Urea Gel	—	3450086†	—	—	—
10% TBE-Urea Gel	3450088†	3450089†	3450090†	—	—
15% TBE-Urea Gel	3450091	3450092	3450093†	—	—
Criterion Empty Cassettes					
1.0 mm thick, 10 sets	3459901	3459902	3459903	3459904	3459906
Loading Guides					
Criterion Sample Loading Guide††	1656006	1656007	1656008	—	—

continues

See Also

Premixed running buffers: page 218.

Catalog # Description

Criterion XT Buffers and Reagents

1610788***	XT MOPS Running Buffer , 20x, 500 ml
1610789***	XT MES Running Buffer , 20x, 500 ml
1610790	XT Tricine Running Buffer , 20x, 500 ml
1610791	XT Sample Buffer , 4x, 10 ml
1610792	XT Reducing Agent , 20x, 1 ml
1610793***	XT MOPS Buffer Kit , includes 500 ml of 20x XT MOPS running buffer, 10 ml of 4x XT sample buffer, 1 ml of 20x XT reducing agent
1610796***	XT MES Buffer Kit , includes 500 ml of 20x XT MES running buffer, 10 ml of 4x XT sample buffer, 1 ml of 20x XT reducing agent
1610797	XT Tricine Buffer Kit , includes 500 ml of 20x XT Tricine running buffer, 10 ml of 4x XT sample buffer, 1 ml of 20x XT reducing agent

Application Guide

4110001 **Criterion Precast Gel Application Guide**, available online

* Multichannel pipet compatible.

** Includes reference well(s), 15 µl.

*** Purchase of this product is accompanied by a limited license under U.S. patents 6,143,154; 6,096,182; 6,059,948; 5,578,180; 5,922,185; 6,162,338; and 6,783,651 and corresponding foreign patents.

† Please allow up to 2 weeks for delivery.

†† U.S. patent 5,656,145.

Criterion Accessories

Empty Cassettes

Single-use empty Criterion cassettes are available for hand casting gels. For added convenience, cast your gels using AnyGel stands.

For More Information

Download bulletins: 2710, 2911, and 2912

AnyGel Stands

AnyGel stands are convenient for storing glass plates of any size gel. They are available as single-row or six-row stands. See the Mini-PROTEAN precast gel section, page 198.

Criterion Staining Trays

Criterion staining/blotting trays are plastic trays designed specifically for staining one or two Criterion gels or performing western blot detection. Tray dimensions are optimized for Criterion gel staining and for blot detection. These dimensions provide a working volume of up to 500 ml.

Dodeca High-Throughput Stainers

Dodeca stainers are high-throughput gel staining devices available in two sizes: the small size accommodates up to 24 Criterion gels while the large size can accommodate up to 12 large-format gels. The stainers eliminate risk of gel breakage from excessive handling. Features of the stainers include:

- A patented* shaking rack designed to hold the staining trays at an angle to allow air bubbles to escape, ensure uniform gel staining, and protect gels from breaking
- Compatibility with Bio-Safe Coomassie, Coomassie, Oriole, SYPRO Ruby, Flamingo, and silver stains



Dodeca stainer components:

1. Shaker motor.
2. Lid with shaker control unit and integrated reagent access door.
3. Tray attachments.
4. Stack of staining trays (including white development tray).
5. Shaking rack designed with built-in handles for easy placement into the solution tank.
6. Gel clip.
7. Solution tank with incorporated drain ports.

- A white development tray that allows easy monitoring of the final development step during the staining process
- A reagent access door integrated into the lid to add staining solutions without disturbing the gels
- Boxes for convenient storage of gels (optional)

* U.S. patent 6,843,593.

Stainer Compatibility with Different Gel Sizes

	Gel Size (W x L)	Gel Format
Large Dodeca stainer	25.6 x 23.0 cm	PROTEAN Plus precast
	25.0 x 20.5 cm	PROTEAN Plus handcast (requires one attachment per tray)
Small Dodeca stainer	20.0 x 20.5 cm	PROTEAN Plus handcast
	18.5 x 20.0 cm	PROTEAN II XL handcast
	18.3 x 19.3 cm	PROTEAN II XL precast
	16.0 x 20.0 cm	PROTEAN II xi handcast
	16.0 x 16.0 cm	PROTEAN II xi handcast and precast
	13.3 x 8.7 cm	Criterion (up to 24 gels, requires one attachment per tray)

Specifications

Number of gels	1–12 large-format gels in the large Dodeca stainer; 1–24 Criterion gels in the small Dodeca stainer (minimum of 4 gels recommended for silver staining)
Shaker device	Built-in shaker motor
Maximum staining solution volume	10 L for the large Dodeca stainer, 7 L for the small Dodeca stainer
Compatible stains	Bio-Safe colloidal Coomassie Brilliant Blue G-250 stain, Coomassie Brilliant Blue R-250 stain, SYPRO Ruby protein gel stain, Oriole and Flamingo fluorescent gel stains, Dodeca silver stain kit
Dimensions (W x L x H)	41.3 x 46.2 x 38.9 cm for both the large and small Dodeca stainers
Weight (empty)	9.1 kg (20 lb) for the large Dodeca stainer 7.5 kg (17 lb) for the small Dodeca stainer

Ordering Information

Catalog #	Description
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AnyGel Stands and Accessories

1654131	AnyGel Stand , single-row, holds 1 PROTEAN gel, 2 Criterion gels, or 3 Mini-PROTEAN mini gels
1655131	AnyGel Stand , 6-row, holds 6 PROTEAN gels, 12 Criterion gels, or 18 Mini-PROTEAN gels
1654132	Replacement Clamps , 2

Criterion Staining Trays

3459921	Criterion Staining/Blotting Trays , with lids, 2
3459920	Criterion Staining/Blotting Trays , with lids, 12

Dodeca Stainers, Accessories, and Replacement Parts

1653400	Dodeca Stainer , large, 100–240 V, includes 13 trays (12 clear, 1 white), 12 tray attachments, shaking rack, solution tank, lid with shaker motor, shaker control unit, gel clip
1653401	Dodeca Stainer , small, 100–240 V, includes 13 trays (12 clear, 1 white), 12 Criterion tray attachments, shaking rack, solution tank, lid with shaker motor, shaker control unit, gel clip
1653405	Dodeca Stainer and Bio-Safe Coomassie Stain Kit , large, 100–240 V, includes large Dodeca stainer (#1653400) and staining solution for a large tank, sufficient for up to 12 large format gels
1653406	Dodeca Stainer and Bio-Safe Coomassie Stain Kit , small, 100–240 V, includes small Dodeca stainer (#1653401) and staining solution for a small tank, sufficient for up to 12 large format gels
1653407	Dodeca Stainer and SYPRO Ruby Protein Gel Stain Kit , large, 100–240 V, includes large Dodeca stainer (#1653400) and SYPRO staining solution for a large tank, sufficient for up to 12 large format gels
1653408	Dodeca Stainer and SYPRO Ruby Protein Gel Stain Kit , small, 100–240 V, includes small Dodeca stainer (#1653401) and SYPRO staining solution for a small tank, sufficient for up to 12 large format gels
1653429	Storage Box , large, holds up to 4 gels on large staining trays
1653430	Storage Box , small, holds up to 4 gels on small staining trays
1653416	Dodeca Stainer Tray , small, replacement, 2
1653420	Dodeca Stainer White Development Tray , small
1653422	Dodeca Stainer Shaking Rack , small, replacement
1653423	Dodeca Stainer Solution Tank , large, replacement
1653424	Dodeca Stainer Solution Tank , small, replacement
1653425	Dodeca Stainer Lid with Shaker Motor , 100–240 V, replacement, fits both tank sizes
1653426	Dodeca Stainer Lid without Shaker Motor , replacement, fits both tank sizes
1653428	Dodeca Stainer Shaker Control Unit , replacement

Large-Format Vertical Electrophoresis Systems

PROTEAN II xi and XL Cells

Large-format cells for protein and nucleic acid electrophoresis applications.

1-D Separations

For the first dimension of separation, choose the PROTEAN II xi cell, available in two sizes (16 x 20 or 20 x 20 cm). Up to four* gels can be run at once using the optional notched inner plate and additional spacers. High-resolution vertical agarose electrophoresis of nucleic acids can be done with the optional frosted glass plates. Conversion screws are available to convert the standard 25 mm well depth to 10 mm.

2-D Separations

For the second dimension of 2-D electrophoresis, choose the PROTEAN II XL cell. This cell is designed to run up to two* (18.3 x 20 cm) gels at once with 17 and 18 cm ReadyStrip IPG strips. Key features include:

- **Leak proof** — innovative clamps exert uniform pressure along the length of the plates to prevent leaking without the use of grease or agarose plugs
- **Sharp bands and spots** — central cooling core can provide smile-free patterns with as little as 1.5 L of buffer
- **Multiple ways to customize** — choose different combs, spacers, clamps, and glass plates to tailor the system to your needs

For More Information

Web: bio-rad.com/largeelectro

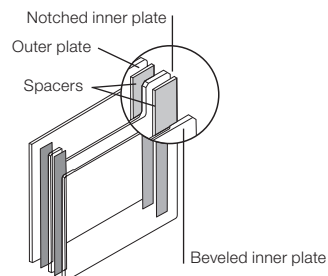
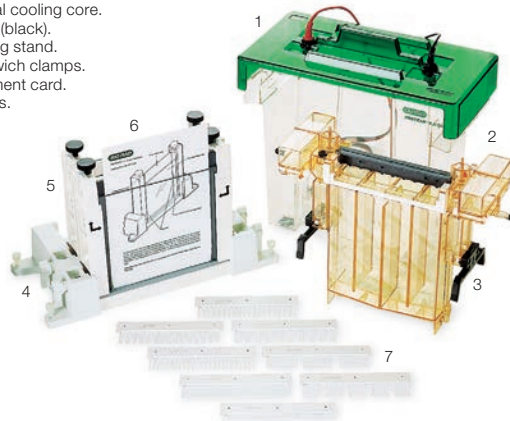
Download bulletin: 1760

PROTEAN II Conversion Kits for 2-D Applications

Conversion kits allow you to expand the capabilities of the PROTEAN II xi cell. Choose the PROTEAN II xi cell IPG conversion kit for running 17 and 18 cm ReadyStrip IPG strips. Three options are available to accommodate different gel thicknesses. The PROTEAN II xi cell 2-D conversion kit can modify the cell to function as a system for running IEF tube gels.

PROTEAN II xi system components:

1. Tank and lid.
2. Central cooling core.
3. Latch (black).
4. Casting stand.
5. Sandwich clamps.
6. Alignment card.
7. Combs.



Optional notched inner plate and additional spacers allow up to four gels to be run in the PROTEAN II xi cell.

See Also

PowerPac Universal and PowerPac HV power supplies: page 187.

PROTEAN II IEF cell: page 228.

Protein electrophoresis stains: page 225.

Premixed buffers: page 218.

Gel clip: page 216.

Dodeca stainers: page 209.

*For higher throughput, the PROTEAN II multi-cell provides six-gel capacity.

Protein Electrophoresis

Large-Format Vertical Electrophoresis Systems

bio-rad.com/largeelectro

Specifications

	PROTEAN II xi (16 cm)	PROTEAN II xi (20 cm)	PROTEAN II XL (20 cm)
Number of gels	1–4	1–4	2
Gel size (W x L)	16 x 16 cm (handcast)	16 x 20 cm (handcast)	18.3 x 20 cm (handcast)
Glass plate size (W x L)			
Inner plate	20 x 16 cm	20 x 20 cm	20 x 20 cm
Outer plate	20 x 18.3 cm	20 x 22.3 cm	20 x 22.3 cm
Spacer length	18.3 cm	22.3 cm	22.3 cm
Typical upper buffer volume	350 ml	350 ml	350 ml
Typical lower buffer volume	1.8 L	1.2 L	1.2 L
Typical run times for SDS-PAGE*			
Without cooling	4 hr	5 hr	5 hr
With cooling	2.5 hr	3.5 hr	3.5 hr
Recommended power supply	PowerPac HV or PowerPac Universal	PowerPac HV or PowerPac Universal	PowerPac HV or PowerPac Universal

* For voltage and current settings for electrophoresis applications, see page 185.

Ordering Information

Catalog # Description

PROTEAN II xi Cells, for 16 x 16 cm Gels*

1651801	PROTEAN II xi Cell, without spacers and combs**
1651802	PROTEAN II xi Cell, 1.5 mm spacers (4), 15-well combs (2)
1651803	PROTEAN II xi Cell, 1.0 mm spacers (4), 15-well combs (2)
1651804	PROTEAN II xi Cell, 0.75 mm spacers (4), 15-well combs (2)

PROTEAN II xi Cells, for 16 x 20 cm Gels

1651811	PROTEAN II xi Cell, without spacers and combs**
1651812	PROTEAN II xi Cell, 1.5 mm spacers (4), 15-well combs (2)
1651813	PROTEAN II xi Cell, 1.0 mm spacers (4), 15-well combs (2)
1651814	PROTEAN II xi Cell, 0.75 mm spacers (4), 15-well combs (2)

PROTEAN II XL Cells, for 18.3 x 20 cm Gels,* Compatible with ReadyStrip IPG Strips

1653188	PROTEAN II XL Cell, wide-format, 1.0 mm, spacers (4), IPG 2-D combs (2)
1653189	PROTEAN II XL Cell, wide-format, 1.5 mm, spacers (4), IPG 2-D combs (2)
1653190	PROTEAN II XL Cell, wide-format, 2.0 mm, spacers (4), IPG 2-D combs (2)

PROTEAN II IPG Conversion Kits, for 2-D (to Convert xi to XL)***

1651815	PROTEAN II xi Cell 2-D Conversion Kit, converts PROTEAN II xi cell into a tube gel IEF 2-D system, 2 tube gel adaptors, 24 glass tubes (1.5 mm diameter, 180 mm length), gaskets, grommets, stoppers
1653183	PROTEAN II xi Cell IPG Conversion Kit, 1.0 mm spacers
1653186	PROTEAN II xi Cell IPG Conversion Kit, 1.5 mm spacers
1653184	PROTEAN II xi Cell IPG Conversion Kit, 2.0 mm spacers
1651834	PROTEAN II xi Basic Unit with Casting Stand, includes central cooling core, lower buffer chamber, lid with cables, leveling bubble; combine with an IPG conversion kit for a complete 18.3 cm wide format system

* All cells include central cooling core with gaskets, lower buffer chamber, lid with cables, 2 sets of glass plates, sandwich clamps (4), upper buffer dam, casting stand with gaskets, leveling bubble, instructions, and alignment card.

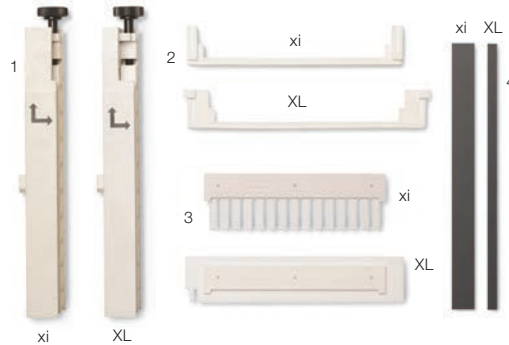
** Select spacers and combs from pages 213–214.

*** All PROTEAN II xi cell IPG conversion kits include 2 sets of IPG clamps, 2 sets of 20 x 20 cm glass plates, IPG spacers (4), IPG 2-D combs (2), IPG central cooling core gaskets (2), casting stand gaskets (2), and alignment card.

PROTEAN II xi and XL Accessories

Accessories and replacement parts are available for the PROTEAN II xi and XL systems. There are a wide variety of glass plates, spacers, and combs to choose from. Components can be purchased separately for a truly customized system. Replacement parts are also available to keep your system up and running.

For More Information
Web: bio-rad.com/largeelectro
Download bulletin: 1760



PROTEAN II xi and XL (IPG) component comparison:
1. The 4 mm xi and 13 mm XL clamp notches.
2. The 181 mm xi and 198 mm XL central cooling core gaskets.
3. The 153 mm xi and 184 mm XL combs.
4. The 19 mm xi and 8 mm XL spacers.

See Also

PowerPac Universal power supply: page 188.
Premixed buffers and buffer reagents: page 252.
Dodeca stainers: page 209.

Maximum Sample Volume per Well for PROTEAN II xi and XL Combs*

Number or Type of Wells	Well Width	Comb Thickness				
		0.5 mm	0.75 mm	1.0 mm	1.5 mm	3.0 mm
25	3.5 mm	—	60 µl	80 µl	120 µl	—
20	5.0 mm	54 µl	82 µl	110 µl	164 µl	328 µl
15	6.5 mm	74 µl	110 µl	147 µl	221 µl	442 µl
10	1.0 cm	114 µl	172 µl	229 µl	343 µl	687 µl
5	2.3 cm	—	—	522 µl	783 µl	1.57 ml
3	4.0 cm	—	—	—	1.37 ml	—
Blank	14.5 cm	—	2.44 ml	3.26 ml	4.88 ml	9.76 ml
2-D (IPG well)						
Reference well	3.5 mm	—	—	28 µl	42 µl	84 µl
Sample well	17.8–17.9 cm	—	—	—	—	—

* At standard 25 mm well depth.

Ordering Information

Catalog # Description

PROTEAN II xi Accessories for Running Gels

1651901	PROTEAN II xi Sandwich Clamps , 16 cm set (1 left, 1 right)
1651902	PROTEAN II xi Sandwich Clamps , 20 cm set (1 left, 1 right)
1651913	PROTEAN II xi Replacement Gaskets , for central cooling core, 2

PROTEAN II XL Accessories for Running Gels

1651835	PROTEAN II XL Sandwich Clamps , IPG set (1 left, 1 right)
1653182	PROTEAN II XL Replacement Gaskets , for central cooling core, 2

PROTEAN II xi and XL Accessories for Running Gels

1651806	Central Cooling Core , includes 2 gaskets
1651807	Buffer Tank
1651808	Cell Lid , with power cables
1651909	Upper Buffer Dam
1005430	PROTEAN II Latch Assembly Kit , for central cooling core

PROTEAN II xi and XL Casting Apparatus

1651911	Slab Gel Casting Stand , with gaskets
1651912	Replacement Gaskets , for casting stand, 2

PROTEAN II xi Glass Plates*

1651821	Inner Plates , for 16 x 16 cm gels, 16 x 20 cm, 2, for PROTEAN II xi cell only
1651822	Outer Plates , for 16 x 16 cm gels, 18.3 x 20 cm, 2, for PROTEAN II xi cell only

PROTEAN II xi Specialty Glass Plates

1651826**	Frosted Inner Plates , for agarose gels, 20 x 20 cm, 2, for PROTEAN II xi cell only
1651832	Notched Inner Plate , for double-up procedures, 16 x 16 cm gel, 16 cm bevel length, for PROTEAN II xi cell only
1651833	Notched Inner Plate , for double-up procedures, 20 x 20 cm gel, 16 cm bevel length, for PROTEAN II xi cell only

PROTEAN II xi and XL Glass Plates, for 16 x 20 or 18.3 x 20 cm gels*

1651823	Inner Plates , 20 x 20 cm, 2
1651824	Outer Plates , 22.3 x 20 cm, 2

Spacer Width	0.5 mm	0.75 mm	1.0 mm	1.5 mm	3.0 mm
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PROTEAN II xi Spacers (Set of 4)

16 cm gels	1651841	1651842	1651843	1651844	1651845
20 cm gels	1651846	1651847	1651848	1651849	1651850

PROTEAN II xi Combs**

Blank	—	1651891	1651892	1651893	1651894
2-D IPG	—	—	1651897	1651898	1651899
3-Well	—	—	—	1651888	—
5-Well	—	—	1651882	1651883	1651884
10-Well	1651875	1651876	1651877	1651878	1651879
15-Well	1651870	1651871	1651872	1651873	1651874
20-Well	1651865	1651866	1651867	1651868	1651869
25-Well	—	1651861	1651862	1651863	—

Spacer Width		1.0 mm	1.5 mm	2.0 mm
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PROTEAN II XL Combs, IPG Strip Format

2-D IPG (with reference well)	1651838	1653187	1651839
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Catalog # Description

PROTEAN II XL Spacers, IPG Strip Format (Set of 4)

1651836	20 cm Spacers , 1.0 mm
1653181	20 cm Spacers , 1.5 mm
1651837	20 cm Spacers , 2.0 mm

* One gel sandwich consists of 1 outer plate, 1 inner plate, and 2 spacers.

** Each comb is 15.2 cm long. All combs except the 2-D combs produce sample wells that are 25 mm deep. The well depth of the 2-D comb is 8 mm. The well depth of all standard combs can be converted from 25 mm to 10 mm with comb conversion screws (#1651859).

PROTEAN II Multi-Gel Casting Chamber

- Up to twelve 1.5 mm thick gels can be cast simultaneously
- Top filling for uniform single percentage gels
- Bottom filling for reproducible gradient gels using the Model 495 gradient former (see page 216)
- Accommodation for 16 or 20 cm gels
- Acrylic blocks can be used as space fillers when fewer than 10 gels are cast, and reusable separation sheets offer easy separation of gel sandwiches after casting



See Also

Acrylamide gel-casting reagents: page 221.
Premixed buffers: page 218.

Ordering Information

Catalog #	Description
1652025	PROTEAN II xi Multi-Gel Casting Chamber , includes casting chamber, sealing plate, silicone gasket, 15 separation sheets, 4 acrylic blocks, 10 xi alignment cards, tapered luer connector, leveling bubble
1652024	PROTEAN II XL Multi-Gel Casting Chamber , includes casting chamber, sealing plate, silicone gasket, 15 separation sheets, 4 acrylic blocks, 10 XL alignment cards, tapered luer connector, leveling bubble

Accessories

1651957	Acrylic Blocks , 4
1651958	Separation Sheets , 15
1652026	Sealing Gaskets , 3
1652029	PROTEAN II xi Alignment Cards , 2
1651840	PROTEAN II XL Alignment Cards , 2

See Also

Acrylamide
gel-casting reagents:
page 221.

Premixed buffers:
page 218.

Large-Format Electrophoresis Accessories

PROTEAN Plus Combs and Hinged Spacer Plates

PROTEAN Plus hinged spacer plates are two glass plates joined together by a silicone hinge with integrated spacers bonded onto the long plate to guarantee perfect alignment during casting and eliminate potential current leaks. The differential plate heights facilitate easy IPG strip or tube gel loading. The hinged spacer plate sizes are the same for both gel sizes (20 and 25 cm wide). Combs are available for both 20 and 25 cm wide gel sizes and 1.0, 1.5, or 2.0 mm thick gels.

PROTEAN Plus Multi-Casting Chamber

Use the PROTEAN Plus multi-casting chamber to cast up to 12 gels of 1.0, 1.5, or 2.0 mm thickness simultaneously. The chamber accommodates the PROTEAN Plus hinged spacer plates for both 20 and 25 cm wide gel sizes. Acrylic blocks act as space fillers when fewer than 12 gels are cast, and a leveling bubble ensures level interfaces. Gradient gels are cast through a bottom port using the Model 495 gradient former (below).

Dodeca High-Throughput Stainers

Dodeca stainers are available in two sizes: the small size accommodates up to 24 Criterion gels while the large size can accommodate up to 12 large-format gels. The stainers ensure consistent results and eliminate gel breakage from excessive handling.

Model 495 Gradient Former

This gradient former allows you to pour linear or convex exponential acrylamide gradients. Its 100–1,500 ml capacity is designed to pour up to 12 gradient slab gels in the PROTEAN Plus multi-casting chamber. The optional exponential piston is required to form convex exponential acrylamide gradients.

AnyGel Stands

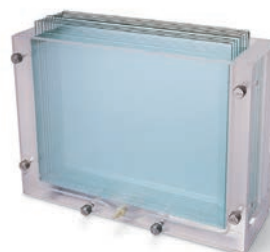
AnyGel stands provide stabilization and access to virtually any size gel. The clamping mechanism secures gel cassettes vertically without excessive pressure.

Gel Clip

The gel clip facilitates the handling of large-format gels and eliminates gel breakage by minimizing direct hands-on gel manipulation. The gel clip gently but securely clamps along one edge of a gel, distributing the weight evenly so that the gel can be easily lifted without tearing.



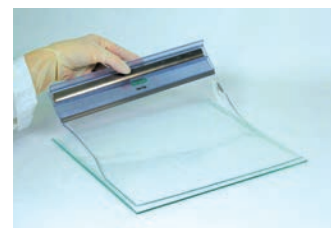
Hinged Spacer Plates



PROTEAN Plus Multi-Casting Chamber



Large Dodeca Stainer



Using the gel clip to clamp onto a gel (PROTEAN Plus precast gel shown).

Ordering Information

Catalog #	Description
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PROTEAN Plus Combs

1654176	2-D Comb with 1 Reference Well, 20 cm, 1.0 mm
1654177	2-D Comb with 1 Reference Well, 20 cm, 1.5 mm
1654179	2-D Comb with 1 Reference Well, 25 cm, 1.0 mm
1654181	2-D Comb with 1 Reference Well, 25 cm, 2.0 mm

PROTEAN Plus Hinged Spacer Plates

1654170	Hinged Spacer Plates, for 20 x 20.5 cm gels, 1.0 mm, 1 set
1654171	Hinged Spacer Plates, for 20 x 20.5 cm gels, 1.5 mm, 1 set
1654173	Hinged Spacer Plates, for 25 x 20.5 cm gels, 1.0 mm, 1 set
1654174	Hinged Spacer Plates, for 25 x 20.5 cm gels, 1.5 mm, 1 set
1654175	Hinged Spacer Plates, for 25 x 20.5 cm gels, 2.0 mm, 1 set

PROTEAN Plus Multi-Casting Chamber

1654160	PROTEAN Plus Multi-Casting Chamber, includes casting chamber, sealing plate, silicone gasket, tapered luer connector, leveling bubble, 15 separation sheets, 8 acrylic blocks (order glass hinged spacer plates and combs separately)
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Accessories for PROTEAN Plus Multi-Casting Chamber

1654165	Separation Sheets, for PROTEAN Plus multi-casting chamber, 15
1654162	Acrylic Block, 3 mm
1653320	Gel Releasers, 5

Gel Clip

1653414	Gel Clip, holds any gel size
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Model 495 Gradient Former

1654121	Model 495 Gradient Former, 100–1,500 ml, includes body with valve stem and tubing connection kit
1654123	Model 495 Gradient Former and PROTEAN Plus Multi-Casting Chamber, includes #1654121 and #1654160

Accessories for Model 495 Gradient Former

1652008	Tubing Connection Kit, includes stopcock, luer taper coupling, tubing (1/8" ID, 3'), Y-connector
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PROTEAN II xi Plate Washer/Holder

1651992*	PROTEAN II xi Plate Holder
1610722	Bio-Rad Cleaning Concentrate, 50x, 1 kg

* Not compatible with Mini-PROTEAN 3 short plates and spacer plates or with PROTEAN Plus hinged spacer plates.

Accessories and Replacement Parts for PROTEAN Plus Dodeca Cell

1654158	Recirculation Pump, 100/120 V
1654159	Recirculation Pump, 220/240 V
1654154	Replacement Gasket Assembly
1654155	Replacement Electrode Card, anode
1654156	Replacement Electrode Card, cathode
1654167	Buffer Exhaust Tubing
1653320	Gel Releasers, 5
1652948	Replacement Power Cables, for lid

Buffers and Reagents for Protein Electrophoresis

See Also

ReadyPrep 2-D sample preparation kit: page 4.

ReadyStrip IPG strips: page 230.

Premixed Sample Loading Buffers

The concentrated formulas of these buffers allow them to be used with both liquid and lyophilized samples. All premixed sample buffers are tested to ensure quality and consistency.



For More Information

Web: bio-rad.com/proteinreagents

Premixed Sample Loading Buffer Selection Guide

Buffer	Formulation	Applications
Laemmli sample buffer (2x)	62.5 mM Tris-HCl, pH 6.8, 2% SDS, 20% glycerol (w/v), 0.01% bromophenol blue (BPB)	SDS-PAGE
Laemmli sample buffer (4x)	250 mM Tris-HCl, pH 6.8, 4% LDS, 40% glycerol (v/v), 0.02% bromophenol blue (BPB)	SDS-PAGE
Native sample buffer	62.5 mM Tris-HCl, pH 6.8, 40% glycerol (w/v), 0.01% BPB	Native PAGE
Tricine sample buffer	200 mM Tris-HCl, pH 6.8, 2% SDS, 40% glycerol (w/v), 0.04% Coomassie Brilliant Blue G-250	Peptide and small protein SDS-PAGE
IEF sample buffer	50% glycerol (v/v)	IEF

Ordering Information

Catalog #	Description
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Premixed Protein Sample Loading Buffers

1610737	2x Laemmli Sample Buffer , 30 ml
1610747	4x Laemmli Sample Buffer , 10 ml
1610738	Native Sample Buffer , 30 ml
1610739	Tricine Sample Buffer , 30 ml
1610763	IEF Sample Buffer , 30 ml
1610791	XT Sample Buffer , 4x, 10 ml

Premixed Running Buffers

Premixed running buffers can be used with handcast or precast gels. Simply dilute with distilled deionized water. For running buffers designed especially for extended shelf life Criterion XT precast gels, see page 209.



See Also

Criterion XT buffers and reagents: page 209.

Electrophoresis Running Buffer Selection Guide

Buffer	1x Formulation	Applications
Protein Electrophoresis		
10x Tris/glycine/SDS	25 mM Tris, 192 mM glycine, 0.1% SDS, pH 8.3	General SDS-PAGE
10x Tris/glycine	25 mM Tris, 192 mM glycine, pH 8.3	Native PAGE
10x Tris/Tricine/SDS	100 mM Tris, 100 mM tricine, 0.1% SDS, pH 8.3	Peptide SDS-PAGE
10x IEF anode buffer	7 mM phosphoric acid	Analytical isoelectric focusing
10x IEF cathode buffer	20 mM lysine, 20 mM arginine	Analytical isoelectric focusing
Nucleic Acid Electrophoresis		
10x TBE	89 mM Tris, 89 mM boric acid, 2 mM EDTA, pH 8.3	Nucleic acid electrophoresis/sequencing; polyacrylamide or agarose gels
50x TAE	40 mM Tris, 20 mM acetic acid, 1 mM EDTA, pH 8.0	Nucleic acid electrophoresis; polyacrylamide or agarose gels

Ordering Information

Catalog #	Description	Catalog #	Description
Premixed Protein Running Buffers		Premixed Nucleic Acid Running Buffers	
1610732	10x Tris/Glycine/SDS, 1 L	1610733	10x Tris/Boric Acid/EDTA (TBE), 1 L
1610772	10x Tris/Glycine/SDS, 5 L cube	1610770	10x Tris/Boric Acid/EDTA (TBE), 5 L cube
1610734	10x Tris/Glycine, 1 L	1610743	50x Tris/Acetic Acid/EDTA (TAE), 1 L
1610771	10x Tris/Glycine, 5 L cube		
1610744	10x Tris/Tricine/SDS, 1 L		
1610761	10x IEF Anode Buffer, 250 ml		
1610762	10x IEF Cathode Buffer, 250 ml		

Premixed Gel-Casting Buffers

Tris-HCl buffers are available to prepare the stacking and resolving portions of native or SDS-PAGE gels using discontinuous buffer systems according to Laemmli (1970) or Ornstein and Davis (1959). Use the 0.5 M Tris-HCl, pH 6.8, buffer for stacking gels and the 1.5 M Tris-HCl, pH 8.8, buffer for resolving gels.

Ordering Information

Catalog #	Description
1610798	Resolving Gel Buffer, 1.5 M Tris-HCl, pH 8.8, 1 L
1610799	Stacking Gel Buffer, 0.5 M Tris-HCl, pH 6.8, 1 L

See Also

ReadyStrip IPG strips: page 230.
Vertical electrophoresis systems: page 194.
Horizontal electrophoresis systems: page 261.

TGX Stain-Free Solutions

See Also

Mini-PROTEAN
TGX precast gels:
page 198.

Mini-PROTEAN
TGX Stain-Free
precast gels:
page 198.

TGX Handcast Acrylamide Solutions

TGX Stain-Free FastCast Acrylamide Solutions

TGX Stain-Free FastCast acrylamide solutions are ready-to-use solutions for hand casting polyacrylamide gels for SDS-PAGE or PAGE. Stain-free technology eliminates extra steps by confirming electrophoresis results and transfer performance before western blotting, conserving precious samples and reducing waste. Each kit comes with two resolver and stacker solutions, which are each mixed 1:1 with the appropriate amount of TEMED and APS.

TGX FastCast Acrylamide Solutions

TGX FastCast acrylamide solutions are ready-to-use solutions for hand casting polyacrylamide gels for SDS-PAGE or PAGE. Each kit comes with two resolver and stacker solutions, which are each mixed 1:1 with the appropriate amount of TEMED and APS.

Advantages of the TGX and TGX Stain-Free FastCast acrylamide kits:

- **Faster casting times** — ability to pour stacker immediately after resolver
- **Long shelf life gels** — gels can be used up to 1 month after casting when stored at 4°C
- **Fast run times** — run times in as little as 20 min



- **Fast blotting times** — efficient protein transfers in as little as 3 min using the Trans-Blot Turbo transfer system
- **Stain-free technology** — for fast imaging or for better, more reliable total protein normalization in western blotting (using Stain-Free FastCast kits and Bio-Rad stain-free enabled imagers)

For More Information

Web: bio-rad.com/tgxfastcast
bio-rad.com/tgxstainfreefastcast

Approximate Number of Gels per Kit

	Mini Gels (~9 x 7 cm)				Midi Gels (~13 x 9 cm)
	1.0 mm Mini-PROTEAN Cassettes	0.75 mm Glass Plates	1.0 mm Glass Plates	1.5 mm Glass Plates	1.0 mm Criterion Cassettes
Starter Kit	11 gels	19 gels	13 gels	9 gels	6 gels
11 gels	55 gels	95 gels	65 gels	45 gels	30 gels

Ordering Information

Catalog #	Description
1610170	TGX FastCast Acrylamide Starter Kit, 7.5%
1610171	TGX FastCast Acrylamide Kit, 7.5%
1610172	TGX FastCast Acrylamide Starter Kit, 10%
1610173	TGX FastCast Acrylamide Kit, 10%
1610174	TGX FastCast Acrylamide Starter Kit, 12%
1610175	TGX FastCast Acrylamide Kit, 12%
1610180	TGX Stain-Free FastCast Acrylamide Starter Kit, 7.5%
1610181	TGX Stain-Free FastCast Acrylamide Kit, 7.5%
1610182	TGX Stain-Free FastCast Acrylamide Starter Kit, 10%
1610183	TGX Stain-Free FastCast Acrylamide Kit, 10%
1610184	TGX Stain-Free FastCast Acrylamide Starter Kit, 12%
1610185	TGX Stain-Free FastCast Acrylamide Kit, 12%

Gel-Casting Reagents

Acrylamide

- **Acrylamide powders** — acrylamide and bis-acrylamide powders allow adjustment of concentration and acrylamide/bis ratio
- **Premixed acrylamide/bis powders** — premeasured amounts allow stock solutions from 30–50% to be prepared directly in the bottle by adding the indicated amount of water
- **Acrylamide solutions** — ready to use and available in two concentrations (30% and 40%) and in three acrylamide/bis ratios (19:1, 29:1, and 37.5:1)

Pore Size Determination: %T and %C

Polyacrylamide gels are described in terms of two parameters that determine pore size: total monomer concentration (%T) and weight percentage of cross-linker (%C).

$$\%T = \frac{\text{grams acrylamide} + \text{grams crosslinker}}{\text{total volume, ml}} \times 100\%$$

$$\%C = \frac{\text{grams crosslinker}}{\text{grams acrylamide} + \text{grams crosslinker}} \times 100\%$$

By varying these two parameters, the pore size of the gel can be optimized to give the best separation and resolution for



Acrylamide/CrossLinker Ratio by Application

Ratio	%C	Common Applications
19:1	5	DNA sequencing
29:1	3.3	Protein separation
37.5:1	2.6	Protein separation

the molecule of interest. For help in determining the best %T and %C for your application, refer to the Precast Gels sections on pages 198 and 204–209. Examples of migration patterns of proteins on gels of different compositions can be found on pages 199 (Mini-PROTEAN TGX precast gels) and 206–207 (Criterion precast gels), or contact Bio-Rad Technical Support.

For More Information

Web: bio-rad.com/acrylamide
Download bulletins: 1156 and 1866

Ordering Information

Description

Acrylamide Solutions*	500 ml	2 x 500 ml
30% acrylamide/bis, 19:1	1610154	—
30% acrylamide/bis, 29:1	1610156	1610157
30% acrylamide/bis, 37.5:1	1610158	1610159
40% acrylamide/bis, 19:1	1610144	1610145
40% acrylamide/bis, 29:1	1610146	1610147
40% acrylamide/bis, 37.5:1	1610148	1610149
40% acrylamide	1610140	—
2% bis solution	1610142	1610143

Catalog # Description

Acrylamide Powder

1610100	Acrylamide, 99.9%, 100 g
1610101	Acrylamide, 99.9%, 500 g
1610107	Acrylamide, 99.9%, 1 kg

Premixed Acrylamide/Bis Powder

1610125	Acrylamide/Bis Powder, 150 g, 37.5:1
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Catalog # Description

1615100	SDS-PAGE Reagent Starter Kit, includes 100 g acrylamide, 5 g bis, 5 ml TEMED, 10 g ammonium persulfate
1632091	ReadyPrep Proteomics Grade Water, 500 ml

*Store acrylamide solutions at 4°C. All other reagents should be stored at room temperature, dry, and away from direct sunlight.

Crosslinkers and Catalysts

Bio-Rad offers standard and alternative crosslinkers for a variety of applications.

Crosslinker Application Guide

	Formal Name	Chemical Structure	Applications
Bis	N,N'-methylene-bis-acrylamide	$\text{CH}_2=\text{CH}-\overset{\text{O}}{\parallel}{\text{C}}-\text{NH}-\text{CH}_2-\text{NH}-\overset{\text{O}}{\parallel}{\text{C}}-\text{CH}=\text{CH}_2$	General crosslinker in PAGE

Ordering Information

Catalog #	Description
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Crosslinkers

1610201	Bis Crosslinker , 50 g
1610142	2% Bis Solution , 500 ml
1610143	2% Bis Solution , 2 x 500 ml

Catalysts

1610800	TEMED , 5 ml (hazardous shipping charges may apply)
1610801	TEMED , 50 ml
1610700*	Ammonium Persulfate (APS) , 10 g

* For longer shelf life, store desiccated at room temperature.

IEP/IEF Agaroses

Standard low $-m_r$ agarose — with high strength and clarity and low $-m_r$ value, this agarose is recommended for all standard immunoelectrophoresis applications.

Zero $-m_r$ agarose — this agarose is specific for IEF. It has no detectable electroendosmosis and is recommended for IEF of very high MW proteins or complexes that are subject to varying degrees of molecular sieving in polyacrylamide gels. Agarose IEF and post-run processing can be completed more quickly than with polyacrylamide gel IEF.

For More Information

Web: bio-rad.com/IEP/IEFAgaroses

Ordering Information

Catalog #	Description
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1620100	Standard Low $-m_r$ Agarose , 100 g
1620102	Standard Low $-m_r$ Agarose , 500 g
1620022	Zero $-m_r$ Agarose , 10 g

All reagents should be stored at room temperature, dry, and away from direct sunlight.

Accessory Reagents

Bromophenol Blue Tracking Dye

Bio-Rad offers bromophenol blue tracking dye to monitor protein electrophoresis runs.

Ordering Information

Catalog #	Description
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1610404	Bromophenol Blue , 10 g
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Store at room temperature, dry, and away from direct sunlight.

Detergents

SDS is available in a powder form or as 10% and 20% solutions. They are prepared with 18 MΩ water and have no detectable DNase or RNase activity. Also available are Tween 20 for blotting solutions and Triton X-100 and CHAPS for membrane protein solubilization. For simple, accurate pipetting, a solution of 10% Tween 20 is available.

See Also

ReadyPrep 2-D sample preparation kits: page 3.

Ordering Information

Catalog #	Description
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1610301	SDS (Sodium Dodecyl Sulfate) , 100 g
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1610302	SDS (Sodium Dodecyl Sulfate) , 1 kg
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1610416	SDS Solution , 10% (w/v), 250 ml
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1610418	SDS Solution , 20% (w/v), 1 L
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1706531	Tween 20 , EIA grade, 100 ml
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1610407	Triton X-100 Detergent , 500 ml
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1610460*	CHAPS , 1 g
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1610781	10% Tween 20 , for easy pipetting, 1 L
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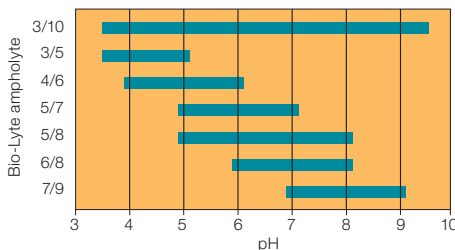
* Store desiccated at 4°C. All other reagents should be stored at room temperature, dry, and away from direct sunlight.

See Also

ReadyStrip IPG strips: page 230.
PROTEAN i12 IEF system: page 228.

Bio-Lyte Ampholytes

Bio-Lyte carrier ampholytes, supplied as aqueous solutions, are blended to give a complete range of isoelectric points for linear pH gradients. Bio-Lyte 3/10 and 3/5 ampholytes extend from approximately pH 3.5 to 9.5 units on the acidic and basic ends. All other ranges are within 0.1–0.2 pH units of their specified range. Bio-Lyte ampholytes are also used as IPG buffers. For ready-to-use ampholytes, see ReadyStrip IEF buffers (page 231).



pH range of each Bio-Lyte ampholyte.

Ordering Information

Catalog #	Description	Catalog #	Description
1631112	Bio-Lyte 3/10 Ampholyte , 40%, 10 ml	1631192	Bio-Lyte 5/8 Ampholyte , 40%, 10 ml
1631113	Bio-Lyte 3/10 Ampholyte , 40%, 25 ml	1631193	Bio-Lyte 5/8 Ampholyte , 40%, 25 ml
1631132	Bio-Lyte 3/5 Ampholyte , 20%, 10 ml	1631162	Bio-Lyte 6/8 Ampholyte , 40%, 10 ml
1631142	Bio-Lyte 4/6 Ampholyte , 40%, 10 ml	1631163	Bio-Lyte 6/8 Ampholyte , 40%, 25 ml
1631143	Bio-Lyte 4/6 Ampholyte , 40%, 25 ml	1631172	Bio-Lyte 7/9 Ampholyte , 40%, 10 ml
1631152	Bio-Lyte 5/7 Ampholyte , 40%, 10 ml		
1631153	Bio-Lyte 5/7 Ampholyte , 40%, 25 ml		

Cleaning Concentrate

Bio-Rad's cleaning concentrate is a moderately alkaline detergent that cleans by solubilization and emulsification. It is ideal for cleaning glass plates and other laboratory equipment and is harmless to skin and clothing.

Ordering Information

Catalog #	Description
1610722	Bio-Rad Cleaning Concentrate , 50x, 1 kg

Gel Drying Solution

Bio-Rad's gel drying solution is a pretreatment for polyacrylamide gels that helps prevent gels from cracking during air or vacuum drying. Just 10 minutes of equilibration in the solution before drying prevents excessive gel swelling and cracking.

Ordering Information

Catalog #	Description
1610752	Gel Drying Solution , 1 L

Protein Stains

Bio-Rad offers visible and fluorescent gel stains to accommodate your needs for sensitivity, linearity, and mass spectrometry compatibility.

Gel Stain Selection Guide

Stain	Staining per Band	Time	Comments
Coomassie Stains			
QC Colloidal Coomassie	3.0 ng	1–20 hr	Colloidal endpoint stain; nonhazardous formulation
Bio-Safe Coomassie G-250	8.0–28.0 ng	1–2.5 hr	Nonhazardous staining in aqueous solution; premixed; mass spectrometry compatible
Coomassie Brilliant Blue R-250	36.0–47.0 ng	2.5 hr	Simple and consistent; mass spectrometry compatible
Silver Stains			
Silver Stain Plus kit (Gottlieb and Chavko 1987)	0.6–1.2 ng	1.5 hr	Simple and robust; mass spectrometry compatible
Silver stain (Merril et al. 1981)	0.6–1.2 ng	2 hr	Stains glycoproteins, lipoproteins, lipopolysaccharides, nucleic acids
Fluorescent Stains			
Oriole fluorescent gel stain	0.5–1.0 ng	1.5 hr	Rapid fluorescent gel stain; no destaining; mass spectrometry compatible; compatible only with UV excitation
Flamingo fluorescent gel stain	0.25–0.5 ng	5 hr	High sensitivity; broad dynamic range; no destaining; simple; mass spectrometry compatible; excellent for LED and laser-based scanners
SYPRO Ruby protein gel stain	1.0–10.0 ng	3 hr	Fluorescent protein stain; simple, robust protocol; broad dynamic range; mass spectrometry compatible
Nucleic Acid Stains			
Ethidium bromide	50.0 ng	1 hr	Classic fluorescent DNA stain

Coomassie Stains

QC Colloidal Coomassie Stain

The QC colloidal Coomassie stain provides sensitivity down to ~3 ng BSA, low background end-point staining, and the level of reproducibility needed to meet regulatory standards. Additionally, it is formulated to be ready to use and environmentally friendly. Features include:

- Low background, high sensitivity, superior reproducibility
- Environmentally friendly formulation — no addition of methanol or acetic acid required; eliminates the need for hazardous waste disposal
- Flexible staining and destaining times — from 1 hr to overnight
- No alcohol addition or dilution steps necessary when staining polyacrylamide gels
- One-part, ready-to-use colloidal Coomassie stain

For More Information

Web: bio-rad.com/coomassie

Request or download bulletin: 6385

Coomassie Brilliant Blue R-250 Staining and Destaining Solutions

Coomassie Brilliant Blue R-250 staining solution is the fastest and easiest way to stain Criterion or other polyacrylamide protein gels using Coomassie stain. Coomassie R-250 staining and destaining solutions are ready to use.



QC Colloidal Coomassie Stain



Bio-Safe Coomassie Stain

Bio-Safe Coomassie Stain

Bio-Safe Coomassie Brilliant Blue G-250 stain is a premixed, ready-to-use, nonhazardous solution that does not require the use of methanol and acetic acid for destaining. Bio-Safe Coomassie stain produces blue bands on a clear background and is fast, simple, sensitive, and convenient. Advantages include:

- Staining in aqueous solution — no special handling or fume hood requirements
- Visibility of bands while gel is in the stain
- No solvent waste problems or disposal costs

For More Information

Web: bio-rad.com/coomassie

Download bulletin: 2423

See Also

Precast polyacrylamide gels: pages 198, 204.
Imaging systems: page 298.

Ordering Information

Catalog # Description

QC Colloidal Coomassie Stain

1610803 QC Colloidal Coomassie Stain, 1 L

Bio-Safe Coomassie Stain

1610786 Bio-Safe Coomassie Stain, 1 L

1610787 Bio-Safe Coomassie Stain, 5 L

Coomassie Brilliant Blue R-250 Staining and Destaining Solutions

1610435 Coomassie Brilliant Blue R-250 Staining Solutions Kit, includes 1 L Coomassie Brilliant Blue R-250 staining solution, 2 x 1 L Coomassie Brilliant Blue R-250 destaining solution

1610436 Coomassie Brilliant Blue R-250 Staining Solution, 1 L

1610437 Coomassie Brilliant Blue R-250 Staining Solution, 4 x 1 L

1610438 Coomassie Brilliant Blue R-250 Destaining Solution, 1 L

1610439 Coomassie Brilliant Blue R-250 Destaining Solution, 4 x 1 L

Coomassie Stain Powders

1610400 Coomassie Brilliant Blue R-250, 10 g

1610406 Coomassie Brilliant Blue G-250, 10 g

Silver Stains

Silver Stain Plus Kit

Silver Stain Plus kit provides the most sensitive and easiest to use silver stain. It is derived from the method developed by Gottlieb and Chavko (1987) for detection of native and denatured eukaryotic DNA in agarose gels. The chemistry has been modified so that it is ideal for both proteins and nucleic acids in polyacrylamide and agarose gels.

The Silver Stain Plus kit:

- Detects nanogram quantities of protein and DNA
- Eliminates background by preventing silver precipitation in the gel matrix
- Does not require destaining
- Stains 13 full-size gels or 40 mini gels

Bio-Rad Silver Stain Kit

Bio-Rad's original silver stain kit, derived from the method of Merril et al. (1981), is ideal for staining polysaccharides and highly glycosylated proteins that are difficult to stain with the Silver Stain Plus kit. This kit will stain 24 full-size gels or 48 mini gels in 2 hours. The lowest sensitivity is 0.25–0.5 ng.

For More Information

Web: bio-rad.com/silverstain

Download bulletin: 1089

Specifications

	Silver Stain Plus	Silver Stain
Time	1.5 hr	2 hr
Number of Gels	40 mini gels	48 mini gels
Shelf Life	1 yr	1 yr
Storage	4°C	4°C
Lowest Sensitivity	0.6–1.2 ng	0.6–1.2 ng

Ordering Information

Catalog # Description

Silver Stain Plus Kit

1610449 Silver Stain Plus Kit, includes fixative enhancer concentrate, silver complex solution, reduction moderator solution, image development reagent, development accelerator reagent, stains 13 full size or 40 mini gels

1610448 Development Accelerator Reagent, 50 g

1610461* Fixative Enhancer Concentrate, 1 L

1610462* Silver Complex Solution, 100 ml

1610463* Reduction Moderator Solution, 100 ml

1610464* Image Development Reagent, 100 ml

* Hazardous shipping charges may apply.

Ordering Information

Catalog #	Description
Bio-Rad Silver Stain Kit*	
1610443	Silver Stain Kit , includes oxidizer concentrate, silver reagent concentrate, silver stain developer, stains 20 full-size or 48 mini gels
1610444	Oxidizer Concentrate , 480 ml
1610445	Silver Reagent Concentrate , 480 ml

Bio-Rad Silver Stain Kit*

* Hazardous shipping charges may apply.

Fluorescent Stains**Oriole Fluorescent Gel Stain**

Oriole stain is an easy-to-use, fast, and sensitive fluorescent protein gel stain.

- One-step protocol, no fixing or destaining required, full sensitivity achieved in 90 min
- Full compatibility with downstream proteolysis and mass spectrometric analysis
- Nanogram sensitivity and low background
- Compatible with UV excitation imagers such as the Gel Doc EZ and ChemiDoc MP imaging systems

Flamingo Fluorescent Gel Stain

This easy-to-use, economical gel stain is for use with the ChemiDoc MP system and a variety of fluorescence imaging systems.

- Two-step protocol that can be completed in as little as 5 hr
- Compatible with mass spectrometry
- Wide dynamic range and highly linear response (3 orders of magnitude)
- Less than 1 ng protein can be detected

SYPRO Ruby Protein Gel Stain

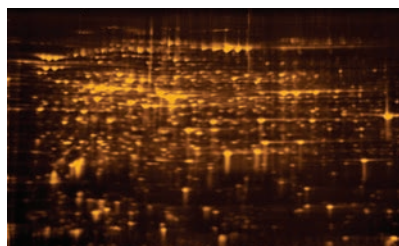
SYPRO Ruby protein gel stain is compatible with mass spectrometry and Edman-based sequencing applications.

- Detection of glycoproteins, lipoproteins, and metalloproteins
- No detection of extraneous nucleic acids in the sample
- Suitable for IEF gels

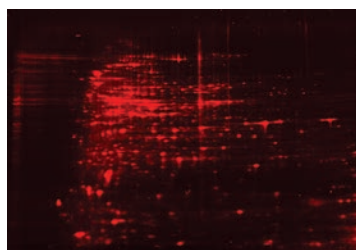
For More InformationWeb: bio-rad.com/fluorescentstain

Download bulletins: Flamingo — 5346, 5705, 5754;

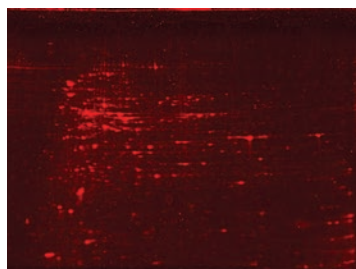
Oriole — 5900, 5921, 5991



2-D gel stained with Oriole stain. *E. coli* protein (40 µg) was run on an 11 cm pH 5–8 ReadyStrip IPG strip for the first dimension and a Tris-HCl 8–16% Criterion gel for the second dimension.



Flamingo fluorescent gel stain. *E. coli* protein sample (10 µg).



SYPRO Ruby protein gel stain. *E. coli* protein sample (10 µg).

See AlsoImaging systems:
page 298.Precast
polyacrylamide gels:
pages 198, 204.2-D electrophoresis:
page 228.

Ordering Information

Catalog # Description

Oriole Fluorescent Gel Stain

1610495	Oriole Fluorescent Gel Stain, 1x solution, 200 ml
1610496	Oriole Fluorescent Gel Stain, 1x solution, 1 L
1610497	Oriole Fluorescent Gel Stain, 1x solution, 5 L

Flamingo Fluorescent Gel Stain

1610490	Flamingo Fluorescent Gel Stain, 10x solution, 20 ml
1610491	Flamingo Fluorescent Gel Stain, 10x solution, 100 ml
1610492	Flamingo Fluorescent Gel Stain, 10x solution, 500 ml

SYPRO Ruby Protein Gel Stain

1703126	SYPRO Ruby Protein Gel Stain, 1x solution, 200 ml
1703125	SYPRO Ruby Protein Gel Stain, 1x solution, 1 L

2-D Electrophoresis

IEF is primarily used as the first dimension of separation in 2-D analysis; 2-D electrophoresis is used to separate complex protein samples based on pI and MW. IEF separations can be performed using two techniques: either with an IPG strip with ampholytes covalently bound to the gel or with carrier ampholytes that move through the gel to generate a pH gradient. Bio-Rad offers products for both techniques. Bio-Rad's first-dimension products are compatible with second-dimension SDS-PAGE systems in mini, midi, and large formats. For more information, see page 183. For preparative IEF products see page 235.

 [Learn More about the Technology](#)
Web: bio-rad.com/tech/2delectro

For More Information
Web: bio-rad.com/2dworkflow

See Also

ReadyStrip IPG strips: page 230.
Protein sample preparation products: page 2.
Vertical electrophoresis systems: page 194

PROTEAN i12 IEF System

The PROTEAN i12 IEF system offers individual lane control — a novel feature that allows multiple lanes to be run simultaneously, each with a different sample, pH gradient, and protocol, resulting in time savings and improved reliability. The flexible system works with ReadyStrip IPG strips to provide many separation range options. The PROTEAN i12 IEF system provides a unique solution for first-dimension separations with the following features:

Individual Lane Control

- Optimize experiments in fewer runs
- Run multiple experiments at once
- Obtain better quality data with less experimental risk — one irregular sample cannot compromise the entire run



PROTEAN i12 IEF system touch screen user interface.

Touch Screen User Interface

- Easily run programs and edit and create protocols

Flexible Electrode and Tray Design

- Run IPG strips gel-side down or gel-side up or load sample with cups, all within the same tray
- Durable polycarbonate trays supply sufficient heat transfer for accurate and reproducible pI determination



PROTEAN i12 IEF system components:

- PROTEAN i12 IEF cell.
- Focusing trays with strip retainers.
- Cleaning brushes.
- Pair of electrodes.
- ReadyStrip IPG Strips.
- Leveling bubble.
- Forceps.
- Styluses.
- USB flash drives.
- Electrode wicks.
- Rehydration trays.
- Rehydration/sample buffer.
- Cleaning concentrate.
- Mineral oil.

Web Application

- Export focusing data via USB port to an Excel spreadsheet or upload to the PROTEAN i12 Reporter (i12reporter.com), a free Web-based application that easily graphs data, compares lanes, and creates reports

For More Information

Web: bio-rad.com/proteani12

Download bulletins: 2651, 6138, 6139, and 6140

Request or download bulletin: 6097

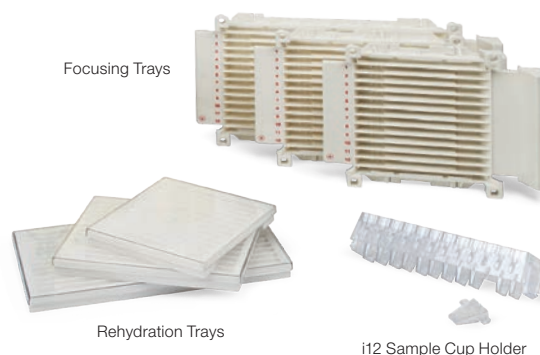
PROTEAN i12 IEF System Specifications

Input power	100–240 VAC, 50/60 Hz	Available focusing tray lengths	7, 11, 13, 17, 18, 24 cm
Voltage per lane	0, 50–10,000 V, 1 V increments	Focusing tray capacity	1–12 IPG strips per tray
Current per lane	0–100 μ A, 1 μ A intervals	Dimensions (W x D x H)	46 x 34.5 x 18.5 cm
Power per lane	0–1 W	Weight	8.6 kg (19 lbs)
Peltier platform temperature	10–25°C	Display	QVGA resolution (320 x 240) touch screen or mouse control

PROTEAN i12 IEF System Accessories

Accessories for the PROTEAN i12 system can also be purchased individually. Six sizes of focusing and rehydration/equilibration trays are available as well as replacement electrodes, cleaning supplies, and other system-related items.

Cup loading is an option for improving your 2-D results, especially for proteins with extreme pIs. The PROTEAN i12 sample cup holder can be used with all of the PROTEAN i12 focusing trays. It effortlessly clips onto the tray and forms a secure seal that prevents leaking but won't damage the IPG strip. The disposable sample cups prevent sample contamination.

**For More Information**

Web: bio-rad.com/proteani12

Download bulletins: 2651, 6138, 6139, and 6140

Request or download bulletin: 6097

Ordering Information

Catalog #	Description
1646000	PROTEAN i12 IEF System , includes basic unit, 90–240 VAC positive and negative electrode assemblies, 7, 11, and 17 cm focusing trays, 1 pack each of 7, 11, and 17 cm rehydration/equilibration trays, 2 pairs of forceps, 2 packs of electrode wicks for gel-side down and gel-side up applications, mineral oil, 2 cleaning brushes, cleaning concentrate, 2 USB flash drives, 3 styluses, pH 3–10 ReadyStrip IPG strips (7, 11, and 17 cm lengths), rehydration/sample buffer, leveling bubble, and instruction manual. All 13, 18, and 24 cm trays and cup loading accessories can be purchased separately
1646001	PROTEAN i12 IEF Cell , includes PROTEAN i12 IEF cell, 90–240 VAC basic unit, positive and negative electrode assemblies, and 3 styluses. Focusing trays and other accessories sold separately

PROTEAN i12 IEF System Accessories

1646107	i12 7 cm Focusing Tray , includes 2 IPG strip retainers
1646111	i12 11 cm Focusing Tray , includes 2 IPG strip retainers
1646113	i12 13 cm Focusing Tray , includes 2 IPG strip retainers
1646117	i12 17 cm Focusing Tray , includes 2 IPG strip retainers
1646118	i12 18 cm Focusing Tray , includes 2 IPG strip retainers
1646124	i12 24 cm Focusing Tray , includes 2 IPG strip retainers
1654035	i12 7 cm Rehydration/Equilibration Tray , includes lids, 25
1654025	i12 11 cm Rehydration/Equilibration Tray , includes lids, 25
1646313	i12 13 cm Rehydration/Equilibration Tray , includes lids, 25
1654015	i12 17 cm Rehydration/Equilibration Tray , includes lids, 25
1654041	i12 18 cm Rehydration/Equilibration Tray , includes lids, 25
1654043	i12 24 cm Rehydration/Equilibration Tray , includes lids, 25
1646040	IPG Strip Retainers , 2
1646020	i12 Sample Cup Holder , includes 25 sample cups
1646021	i12 Sample Cups , 25
1646030	Gel-Side Up Electrode Wicks , 100

continues

Ordering Information

Catalog #	Description
PROTEAN i12 IEF System Accessories	
1646031	Gel-Side Down Electrode Wicks, 500
1646012	Negative Electrode Assembly
1646011	Positive Electrode Assembly
1646010	Electrode Assembly Pair, includes 1 positive and 1 negative electrode assembly
1654072	Cleaning Brushes, 2
1610722	Cleaning Concentrate, 1 kg, 50x
1646060	USB Flash Drive, 2
1646050	Stylus, 3
1632129	Mineral Oil, 500 ml
1654070	Forceps, 1

PROTEAN i12 IEF System Accessories

1646031	Gel-Side Down Electrode Wicks, 500
1646012	Negative Electrode Assembly
1646011	Positive Electrode Assembly
1646010	Electrode Assembly Pair, includes 1 positive and 1 negative electrode assembly
1654072	Cleaning Brushes, 2
1610722	Cleaning Concentrate, 1 kg, 50x
1646060	USB Flash Drive, 2
1646050	Stylus, 3
1632129	Mineral Oil, 500 ml
1654070	Forceps, 1

PROTEAN IEF Accessories

Accessories for the discontinued PROTEAN IEF cell (#1654000 and #1654001) are still available and include electrode wicks and thermal paper.

Rehydration/equilibration trays, cleaning supplies, forceps, and reagents are interchangeable with the PROTEAN i12 IEF system (see page 229 for part numbers).

Ordering Information

Catalog #	Description
Accessories	
1654071	Electrode Wicks, precut, 500
1702412	Thermal Printer Paper, 10 rolls

Accessories

1654071	Electrode Wicks, precut, 500
1702412	Thermal Printer Paper, 10 rolls

See Also

PROTEAN i12 IEF system: page 228.
ReadyPrep 2-D starter kit: page 232.

ReadyStrip IPG Strips

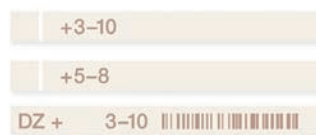
ReadyStrip IPG strips are available in five different strip lengths and in a wide selection of pH gradients, with 3 or 7 pH units per strip. Shorter strips are useful for method development while longer strips provide the best separation possible with higher protein loads. ReadyStrip IPG strips are thoroughly tested for quality and performance to deliver 2-D gel-to-gel reproducibility.

Design Features

- Stringent gel length tolerances of ± 2 mm
- Anode and pH range clearly printed on each strip, with barcoding on 24 cm strips
- Consistent backing lengths for self-centering on 2-D gels

Gradient Selection

- Standard broad range pH gradients for maximum separation on a single gel
- Narrow range gradients for greater resolution (more cm of gel per pH unit)
- Comprehensive offering that increases resolving power in the first dimension with overlapping pH ranges



ReadyStrip IPG strips are preprinted to indicate anode end (+) and pH range; in addition, a barcode is printed on the 24 cm strip.

Relative Focusing Power

The 7 cm pH 3–10 strip is arbitrarily assigned a baseline focusing power of 1.0 in order to calculate the relative focusing power of the other strips.

- **Strips with the same pH range but different lengths** — calculate the ratio of the strip lengths. Compared to a 7 cm strip, an 11 cm strip has a relative focusing power of $11/7$ cm = 1.6
- **Strips with the same length but different pH range** — calculate the ratio of the pH ranges. Compared to a pH 3–10 strip (7 pH units), a pH 5–8 strip (3 pH units) has a relative focusing power of $7/3$ = 2.3

For More Information

Web: bio-rad.com/readystripIPG

Download bulletin: 2442

Relative Focusing Power of IPG Strips

Strip Range*	pH										Relative Focusing Power					ReadyStrip IEF Buffer					
	3	4	5	6	7	8	9	10	7 cm	11 cm	17 cm	18 cm	24 cm	3-10	7-10						
Broad Range																					
3-10											1x	1.6x	2.4x	2.6x	3.4x	●					
3-10 nonlinear (NL)											1x	1.6x	2.4x	2.6x	3.4x	●					
Narrow Range																					
3-6											2.3x	3.7x	5.7x	6.0x	8.0x	●					
5-8											2.3x	3.7x	5.7x	6.0x	8.0x	●					
7-10															2.3x	3.7x	5.7x	6.0x	8.0x		●
4-7											2.3x	3.7x	5.7x	6.0x	8.0x	●					

* Strips are designed with sufficient overlap to allow spot matching while limiting the extent of redundant data.

Ordering Information

pH Range	7 cm	11 cm	17 cm	18 cm	24 cm
ReadyStrip IPG Strips, 12 per Package					
pH 3-10	1632000	1632014	1632007	1632032	1632042
pH 3-10 NL*	1632002	1632016	1632009	1632033	1632043
pH 3-6	1632003	1632017	1632010	1632035	1632045
pH 4-7	1632001	1632015	1632008	1632034	1632044
pH 5-8	1632004	1632018	1632011	1632036	1632046
pH 7-10	1632005	1632019	1632012	1632037	1632047

ReadyStrip IEF Buffers and Accessories**

- 1632094 **Bio-Lyte 3/10 Ampholyte**, 100x, 1 ml
- 1632093 **ReadyStrip 100x 7-10 Buffer**, includes only ampholytes, 1 ml
- 1632099 **ReadyStrip Instruction Manual**, free upon request with ReadyStrip purchases

* NL, nonlinear gradient.

** Dilute ReadyStrip buffers to 1x in each sample to obtain a final concentration of 0.2% ampholyte.

See Also

Bio-Lyte ampholytes:
page 223.

ReadyPrep Reagents for First-Dimension IEF

ReadyPrep reagents ensure success with first- and second-dimension separations. The 2-D starter kit is the ideal tool for learning to use the PROTEAN i12 IEF system and for perfecting technique. Premixed buffers and individual reagents are available for each step of the 2-D process. For preparation of protein samples for 2-D electrophoresis, see page 3.

See Also

ReadyStrip IPG strips and IEF buffers: page 230.

PROTEAN i12 IEF system: page 228.

Criterion system: page 203.

ReadyPrep 2-D Starter Kit

The ReadyPrep 2-D starter kit is intended for first-time users of the PROTEAN i12 IEF cell and ReadyStrip IPG strips. The kit contains tested premixed reagents required for first and second dimension separations, a reference manual with technical tips, and a known protein sample. The ReadyPrep 2-D starter kit includes all reagents needed to:

- Prepare an *E. coli* protein sample
- Rehydrate IPG strips with sample
- Equilibrate IPG strips for SDS-PAGE
- Overlay IPG strips with agarose on SDS-PAGE gels

This kit contains enough material to complete either six 17 cm IPG strips, ten 11 cm strips, or sixteen 7 cm IPG strips.



For More Information

Web: bio-rad.com/readyprep2d

2-D Starter Kit Contents

	Vials/Kit		Vials/Kit
<i>E. coli</i> protein sample, 2.7 mg	1	30% glycerol solution, 70 ml	1
ReadyPrep 2-D starter kit rehydration/sample buffer, 10 ml	1	ReadyPrep overlay agarose, 50 ml	1
ReadyPrep equilibration buffer I, 20 ml	2	Iodoacetamide, 0.5 g	2
ReadyPrep equilibration buffer II, 20 ml	2	Nanopure water, 15 ml	1

Ordering Information

Catalog #	Description
1632105	ReadyPrep 2-D Starter Kit , includes <i>E. coli</i> protein sample and reagents sufficient to rehydrate, focus, and transfer to second-dimension gels; ReadyStrip IPG strips, precast SDS-PAGE gels, and gel stains not included
1632110	<i>E. coli</i> Protein Sample , lyophilized, 2.7 mg

2-D Premixed Buffers and Individual Reagents

Streamline 2-D experiments and reduce variables with Bio-Rad's convenient premixed buffers and protein sample, tested for consistent 2-D performance with IPG strips:

- **ReadyPrep 2-D starter kit rehydration/sample buffer** — a standard formulation appropriate for many protein samples
- **ReadyPrep 2-D starter kit equilibration buffer I** — premixed with DTT for the first equilibration step in the DTT/iodoacetamide alkylation method
- **ReadyPrep 2-D starter kit equilibration buffer II** — add iodoacetamide and use for the second equilibration step in the DTT/iodoacetamide alkylation method; this buffer can also be used for single-step alkylation by adding TBP and acrylamide
- ***E. coli* protein sample** — this complex protein sample is performance tested to give a consistent pattern when used with ReadyPrep 2-D starter kit rehydration/sample buffer; use this sample as a control to validate your 2-D system and protocol before running more difficult experimental samples

Reducing and Alkylating Agents

Either DTT or TBP can be used for IEF and during equilibration prior to SDS-PAGE. Alkylation with iodoacetamide is the standard method to prevent reoxidation during second-dimension SDS-PAGE. Reduction and alkylation can also occur at the sample preparation stage. See the ReadyPrep reduction-alkylation kit, page 4.

Overlay Agaroses

Bromophenol blue tracking dye is incorporated into this solution to allow monitoring of electrophoresis runs. Use ReadyPrep overlay agarose, a low melting point agarose, to secure IPG strips in place for most applications. For second-dimension runs in the PROTEAN Plus cell, in which the IPG strip is oriented perpendicular to the laboratory bench, firmer PROTEAN Plus overlay agarose is recommended to secure the IPG strip.

Individual Reagents and Detergent

Urea and Tris as well as CHAPS detergent are available.

For More Information

Web: bio-rad.com/2dreagents

See Also

Protein sample preparation products: page 2.

ReadyPrep reduction-alkylation kit: page 4.

Ordering Information

Catalog #	Description
1632106	ReadyPrep 2-D Starter Kit Rehydration/Sample Buffer , 10 ml, 8 M urea, 2% CHAPS, 50 mM DTT, 0.2% Bio-Lyte 3/10 ampholyte, 0.001% bromophenol blue
1632107	ReadyPrep 2-D Starter Kit Equilibration Buffer I , with DTT, 10 ml, 375 mM Tris-HCl, pH 8.8, 6 M urea, 2% SDS, 2% DTT
1632108	ReadyPrep 2-D Starter Kit Equilibration Buffer II , without DTT or iodoacetamide, 20 ml, 375 mM Tris-HCl, pH 8.8, 6 M urea, 2% SDS
1632091	ReadyPrep Proteomics Grade Water , 500 ml
1610610	Dithiothreitol (DTT) , 1 g
1610611	Dithiothreitol (DTT) , 5 g
1632101	Tributylphosphine (TBP) , 200 mM, 0.6 ml
1632109	Iodoacetamide , 30 g
1610731	Urea , 1 kg
1610719	Tris , 1 kg

Control Sample

1632110	<i>E. coli</i> Protein Sample , lyophilized, 2.7 mg
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Overlay Agaroses

1632111	ReadyPrep Proteomics Grade Overlay Agarose , 50 ml, 0.5% low melting point agarose in 1x Tris/glycine/SDS and 0.003% bromophenol blue
1632092	PROTEAN Plus Proteomics Grade Overlay Agarose , 125 ml, 0.75% agarose in 1x Tris/glycine/SDS and 0.003% bromophenol blue

Mini-Format Analytical IEF

See Also

PowerPac HV and
PowerPac Universal
power supplies:
page 187.

IEF standards:
page 193.

Bio-Lyte ampholytes:
page 223.

Acrylamide
gel-casting reagents:
page 220.

Agarose:
page 222.

Model 111 Mini IEF Cell

This compact cell performs analytical IEF, including isoenzyme separation, forensic applications, and clinical determinations. Use it to screen large numbers of samples or for quickly running a few samples to determine the pI of a protein of interest. It requires only a 500 V power supply. Please note that this unit does not use IPG strips. Features include:

- Unique inverted format — condensation cannot disrupt electrophoresis results
- No external cooling required
- Bufferless operation — no wicks required
- Casting tray suitable for both agarose and polyacrylamide gels
- Easy-to-clean, removable graphite electrodes
- Small footprint of 21 x 11.5 x 4.2 cm



For More Information

Web: bio-rad.com/model111

Download bulletin: [M1702975](#)

Ordering Information

Catalog #	Description
1702975	Model 111 Mini IEF Cell , includes chamber and lid, graphite electrodes, casting tray, 5 glass plates, 50 sheets of gel support film for polyacrylamide, 5 sample templates

Accessories

1702980	Graphite Electrodes , 2
1702981	Mini Casting Tray
1702982	Glass Plates , 12.5 cm x 6.5 cm x 1.5 mm, 5
1702983	Gel Support Film for Polyacrylamide , 12.5 x 6.5 cm, 50 sheets
1702984	Gel Support Film for Agarose , 12.5 x 6.5 cm, 50 sheets
1702985	Sample Templates , 5

Preparative Electrophoresis

Preparative electrophoresis devices fractionate and purify nanogram to gram quantities of proteins or nucleic acids via liquid phase IEF electrophoresis or continuous electroelution from gels. These devices separate and purify molecules according to their molecular mass (using SDS-PAGE or agarose gel electrophoresis), pI (using liquid-phase IEF), or a combination of both molecular mass and pI (using native PAGE or preparative 2-D electrophoresis). These devices include:

- **Model 491 prep cell and mini prep cell** — perform high-resolution separations of proteins and nucleic acids by continuous-elution gel electrophoresis (PAGE)
- **Model 422 electro-eluter** — elutes macromolecules from gel slices

Preparative Electrophoresis Product Selection Guide

Product	Page	Method of Purification	Molecules Purified	Run Time	Bulletin
Model 491 prep cell	235	SDS-PAGE or native PAGE	Protein (1–500 mg) DNA (60–300 µg) RNA (<1 mg)	4–10 hr	1964
Mini prep cell	235	SDS-PAGE or native PAGE	Protein (0.5–1,000 µg) DNA (<10 µg) RNA (<20 µg)	4–10 hr	1964
Model 422 electro-eluter	237	Electroelution from excised gel pieces	Protein (gel load limits) DNA (<3 mm thick gels)	3–5 hr	—

Preparative PAGE Cells

Model 491 Prep Cell and Mini Prep Cell

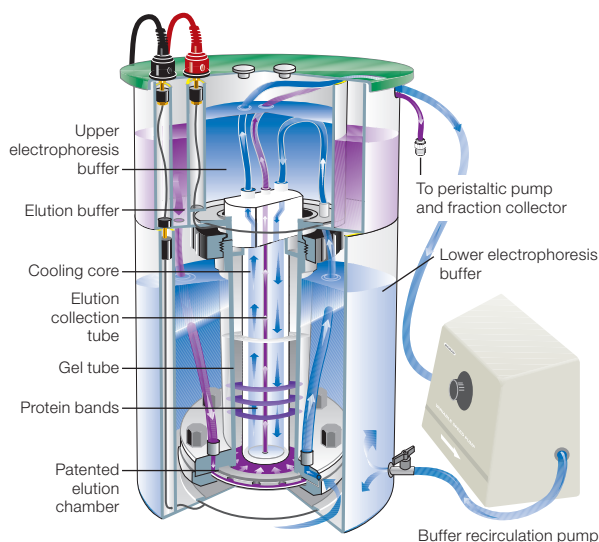
The Model 491 prep cell and mini prep cells separate biomolecules (protein or nucleic acids) by continuous-elution electrophoresis. Samples are electrophoresed through a cylindrical gel matrix, where they are separated into ring-shaped bands. As individual bands migrate off the bottom of the gel, they are collected in discrete liquid fractions. The Model 491 prep cell and the mini prep cell allow resolution of proteins differing in MW by as little as 2%. With these prep cell systems, you can:

- Purify nanogram to milligram quantities of target protein
- Separate proteins that differ in MW by as little as 1 kDa by using SDS-PAGE
- Separate proteins by mass and charge with pI differences as little as 0.1 pH units by using native PAGE
- Separate large proteins or DNA fragments (up to 18 kb) by using agarose gel electrophoresis

For More Information

Web: bio-rad.com/prepPAGE

Download bulletins: 1964, 3153, and 3161



Continuous-elution electrophoresis in the Model 491 prep cell.

Samples are electrophoresed through the cylindrical gel matrix where they are separated into ring-shaped bands. Individual bands migrate off the bottom of the gel and are collected in discrete liquid fractions available for assay and characterization.

See Also

Protein sample preparation products: page 2.

See Also

PowerPac Universal and PowerPac HV power supplies: page 187.

Specifications

	Model 491 Prep Cell	Mini Prep Cell
Sample capacity (mass/volume)	1–500 mg/0.5–15 ml	0.5–1.0 mg/50–500 µl
Gel tube dimensions	28 and 37 mm ID, 14 cm length	7 mm ID, 13 cm length
Cooling	Glazed alumina-ceramic tube	Not necessary
Electrical limits	500 V, 40 mA, 20 W (PowerPac HV or PowerPac Universal recommended)	500 V, 10 mA, 5 W (PowerPac HV or PowerPac Universal recommended)
Elution buffer flow rate	1 ml/min	0.1 ml/min
Auxiliary equipment required	Fraction collector, power supply, peristaltic pump	Fraction collector, power supply

Ordering Information

Catalog #	Description
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Model 491 Prep Cells

1702928	Model 491 Prep Cell without Buffer Recirculation Pump
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Replacement Parts and Accessories for the Model 491 Prep Cell

1702944	Prep Cell Casting Stand
1702929	Buffer Recirculation Pump, 100/120 V
1702930	Buffer Recirculation Pump, 220/240 V
1702932	Small Gel Tube Assembly, 28 mm ID
1702933	Large Gel Tube Assembly, 37 mm ID
1702934	Cooling Finger Assembly, includes feedline connectors
1702935	Buffer Circulation Tubing Kit, includes stopcock with tubing and connectors, 3 elution buffer circulation lines and connectors, and electrophoresis/cooling buffer circulation lines and connectors
1702936	O-Ring Kits, 2
1702937	Dialysis Membranes, precut, 5
1702938	Frit Kit, includes support frit and elution frit
1702939	Sample Application/Overlay Buffer Kit, includes sample loading guide, syringe with tubing
1702940	Thumbscrews, 4
1702969	Lid with Power Cables
1702941	Elution Manifold Base

Mini Prep Cell

1702908	Mini Prep Cell without Reagent Starter Kit
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Replacement Parts and Accessories for the Mini Prep Cell

1702909	Gel Tubes, 2
1702913	Sample Application/Purge Kit
1702947	Peristaltic Pump Adaptor Kit, for 0.8 mm tubing
1702948	Elution Frit Kit, with 5 dialysis membranes, MW cutoff 3,500
1702911	Elution Frit Kit, with 5 dialysis membranes, MW cutoff 6,000
1702912	Harvest Ring Assembly, includes elution collection tubing
1702917	Mini Prep Cell Elution Chamber Top
1702918	Mini Prep Cell Casting Stand
1702916	Elution Manifold Base

Preparative Electroelution Cells

Model 422 Electro-Eluter

The Model 422 electro-eluter is an electroelution cell for preparative recovery of biomolecules from agarose and acrylamide gels. Easy to assemble, the electro-eluter has six vertical glass tubes connecting the upper and lower buffer chambers. A frit at the bottom of each tube retains the gel slice but permits macromolecules to migrate through when current is applied. When the macromolecules have passed through the frit, they are collected (in the membrane cap) for further analysis or testing.

Depending on the buffer system, the Model 422 electro-eluter can be used for protein elution or dialysis. In all cases, setup is quick and easy and the sample is collected in 400–600 µl. The Model 422 electro-eluter can be used for one to six samples without increasing the run time (3–5 hours) or decreasing sample yield.

For More Information
Web: bio-rad.com/electroelution



Specifications

Elution capacity	1–6 samples
Collection volume	400–600 µl
Buffer volume	700 ml
Glass tube dimensions	1 cm (ID) x 6 cm (long)
Recommended power supply	PowerPac Universal
Dimensions (W x D x H)	12 x 16 x 18 cm
Weight	1.1 kg (2.4 lb)

Ordering Information

Catalog #	Description
1652976	Model 422 Electro-Eluter , includes electro-eluter module, membrane caps (MW cutoff 12,000–15,000), glass tubes, frits, silicone adaptors, grommets and stoppers, buffer tank, lid with power cables

Accessories

1652985	Membrane Caps , clear, MW cutoff 12,000–15,000, 12
1652986	Membrane Caps , green, MW cutoff 3,500, 12
1652987	Frits , 12
1652978	Glass Tubes , 6
1652981	Silicone Adaptors , 6
1651988	Grommets and Stoppers , 8

Western Blotting

Bio-Rad's western blotting products include the V3 Western Workflow, systems for protein transfers, blotting membranes, filter paper, premixed blotting buffers, reagents, protein standards, and detection kits.

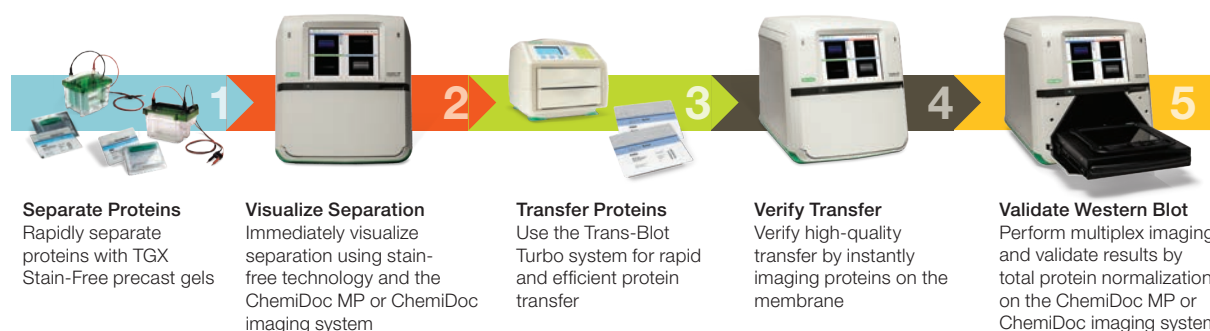
 [Learn More about the Technology](#)
Web: bio-rad.com/tech/westernblotting

V3 Western Workflow Protocol


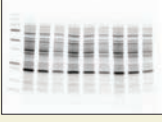



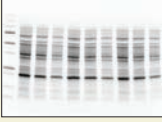
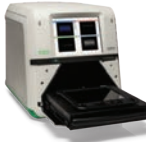
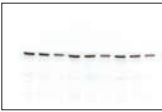






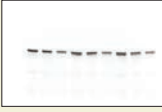
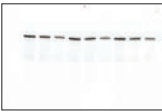
Bio-Rad's V3 Western Workflow — consisting of TGX Stain-Free precast gels, the Trans-Blot Turbo system, and the ChemiDoc MP or ChemiDoc imaging system — incorporates traditional blotting techniques with innovative technology. The five-step streamlined protocol allows quick confirmation of gels and blot transfer quality prior to western blotting and provides total protein blot normalization for rapid and robust quantitation.

Five Steps

- 1. Separate proteins** — Mini-PROTEAN TGX Stain-Free precast gels and Criterion TGX Stain-Free precast gels offer fast, superior protein separation. TGX Stain-Free precast gels feature proprietary in-gel chemistry, enabling high-quality protein separation in as little as 15 minutes (pages 198, 204–209).
- 2. Visualize proteins** — protein separation is visualized and confirmed, using stain-free technology, after 1 minute activation on the ChemiDoc MP or ChemiDoc imaging system. Stain-free technology is a sensitive, time-saving alternative to traditional Coomassie staining (page 299).
- 3. Transfer proteins** — Trans-Blot Turbo system, a rapid protein transfer apparatus, reduces transfer protocols to as little as 3 minutes across a broad MW range (page 241).
- 4. Verify protein transfer** — ChemiDoc MP or ChemiDoc imaging system paired with stain-free technology enables instant verification of protein transfer (page 299).
- 5. Validate and quantitate** — ChemiDoc MP or ChemiDoc imaging system and Image Lab desktop software validate western blotting data via total protein normalization as an alternative to using housekeeping proteins. By normalizing to total protein, stripping and reprobing is no longer necessary.



Bio-Rad V3 Western Workflow vs. Traditional Western Workflow

	Bio-Rad V3 Western Workflow	Time	Data
Total time: ~5 hr	1 Electrophoresis TGX Stain-Free gel Criterion cell ChemiDoc MP/ ChemiDoc system 	20–30 min	 Pre-transfer gel stain-free image to check sample integrity and separation quality
	2 Transfer Trans-Blot Turbo system ChemiDoc MP/ ChemiDoc system 	3–10 min	 Post-transfer gel stain-free image to measure transfer efficiency
	3 Antibody Incubation EveryBlot blocking buffer Clarity western ECL substrate 	~4 hr	 Stain-free blot image as loading control
	4 Imaging and Analysis ChemiDoc MP/ ChemiDoc system (no need to strip and reprobe) 	10–15 min	 or  Target proteins (chemiluminescence) Target proteins (fluorescence)
	Traditional Western Workflow	Time	Data
Total time: 16 hr	1 Gel Preparation 	>1 hr gel prep	—
	2 Electrophoresis 	~1 hr gel run	—
	3 Transfer 	1–3 hr	—
	4 Antibody Incubation 	~5 hr	—
	5 Imaging and Analysis 	>30 min	 Target proteins
	6 Strip and Reprobe (Often need reprob- ing for actin/tubulin as loading control)	~5 hr	 Loading control

For More Information
Web: bio-rad.com/V3

Transfer Devices

Overview of Blot Transfer Systems

- **Rapid transfer systems** — The Trans-Blot Turbo system (page 241) uses prewet, prepackaged consumables for rapid transfer of proteins in as little as 3 minutes across a wide range of protein molecular weights
- **Semi-dry transfer systems** — Trans-Blot SD for rapid, high-intensity transfers, best suited for mid-range proteins, 10–100 kD or >200 kD (page 242)
- **Tank transfer systems** — ideal for most routine protein work, tank transfer systems provide efficient and quantitative protein transfers over a broad MW range and are available with either plate or wire electrodes (page 243)
- **Microfiltration (dot blotting) and screening systems** — used to determine working conditions for a new blotting assay or in situations where protein separation is not required; suitable for both protein and nucleic acid blotting (page 246)

Blotting Selection Guide

	Mini Trans-Blot	Criterion Blotter	Trans-Blot	Trans-Blot Plus	Trans-Blot SD	Trans-Blot Turbo
Blotting area	10.0 x 7.5 cm	15.0 x 9.4 cm	16.0 x 20.0 cm	28.0 x 26.5 cm	24.0 x 16.0 cm	15.0 x 11.0 cm
Gel capacity	2 Mini-PROTEAN gels	4 Mini-PROTEAN or 2 Criterion gels	3 PROTEAN II xi, 6 Criterion, or 12 Mini-PROTEAN gels	Three 26.5 x 28 cm gels or 12 Criterion gels	2 PROTEAN II gel sandwiches, stacked and separated by dialysis membrane; 4 Mini-PROTEAN gels side by side; 3 Criterion gels side by side	2 midi gels (13.5 x 8.5 cm), 4 mini gels (7.0 x 8.5 cm) or similar
Number of gel holders	2	2	3	3	—	—
Buffer requirement	1.2 L	1.3 L	3–4 L	10–12 L	200 ml	N/A
Electrode distance	4.0 cm	4.3 cm	2 positions: 4.0 and 8.0 cm	3 positions: 4.0, 7.0, and 10.0 cm	Determined by thickness of the gel and membrane sandwich and filter paper stack	~8 mm depending on gel thickness
Electrode dimensions	—	—	—	—	25.0 x 18.0 cm	16.0 x 12.0 cm
Electrode materials	Platinum wire	Platinum-coated titanium anode with stainless-steel cathode plates or platinum wire	Platinum-coated titanium anode with stainless-steel cathode plates or platinum wire	Platinum-coated titanium anode and stainless-steel cathode plates	Platinum-coated titanium anode and stainless-steel cathode plates	Platinum-coated titanium anode and stainless-steel cathode plates
Transfer time						
Wire electrodes	Standard: 16 hr High-intensity: 1 hr	Standard: 60 min to overnight	Standard: 5 hr Overnight: 16 hr High-intensity: 30 min–4 hr	—	—	—
Plate electrodes		Standard: 30 min to overnight	Standard: 1–5 hr Overnight: 16 hr High-intensity: 30 min–1 hr	Standard: 16 hr High-intensity: 15 min–1 hr	~30 min	3–10 min
Cooling	Blue cooling unit	Sealed ice block or optional Criterion blotter cooling unit	Super cooling coil	Super cooling coil	—	—
Overall dimensions (W x L x H)	12.0 x 16.0 x 18.0 cm	21.8 x 11.8 x 15.0 cm	18.0 x 9.5 x 24.0 cm	30.0 x 17.3 x 39.4 cm	37.0 x 24.0 x 11.0 cm	26.0 x 21.0 x 20.0 cm

Semi-Dry and Rapid Blotting Systems

Trans-Blot Turbo Transfer System

The Trans-Blot Turbo transfer system represents the next generation of protein transfer. The Trans-Blot Turbo integrates speed, reproducible performance, and ease of use into a complete system, providing results faster than any other method currently available.

The Trans-Blot Turbo blotting system combines traditional blotting techniques with modern filter paper and buffers, allowing rapid transfer of proteins with minimal preparation time. By providing the entire system in a ready-to-use format, researchers can obtain their results faster and easier with reproducibility that is difficult to achieve by traditional tank and semi-dry blotting methods.

Rapid, High-Throughput Transfer

- Transfers standard mini or midi gels in as little as 3 min
- Efficient transfer of high and low MW proteins
- Can transfer 1–4 mini or 1–2 midi gels in a single run
- No cooling period required between runs
- Specialized protocol for Mini-PROTEAN TGX gel transfer in 3 min
- No need to pre-equilibrate gels prior to transfer

Ready-to-Use Transfer Packs

- Ready-to-use transfer packs eliminate the need for buffer and membrane preparation
- Transfer packs available with nitrocellulose and PVDF
- Proprietary buffer included in each transfer pack



Ready-to-Assemble (RTA) Transfer Kits

- Kits provide enough consumables for 40 blots
- Consists of pre-cut membranes, pre-cut filter pads, and specially formulated transfer buffer
- Kits available with nitrocellulose, PVDF, and low-fluorescence PVDF

Flexible Design

- Option to either use rapid preset protocols or customize transfer conditions
- Accommodates traditional semi-dry consumables
- Compatible with various gel types and percentages
- Ability to customize and store protocols within the instrument
- Integrated power supply means no external power supply is needed

Environmentally Friendly

- Environmentally safe consumables eliminate disposal cost
- Single-use consumables reduce waste

For More Information

Web: bio-rad.com/turbo

Request or download bulletin: 6039

Ordering Information

Catalog #	Description		
17001917	Trans-Blot Turbo Transfer Starter System , mini, PVDF		
17001919	Trans-Blot Turbo Transfer Starter System , midi, PVDF		
17001918	Trans-Blot Turbo Transfer Starter System , mini, nitrocellulose		
17001915	Trans-Blot Turbo Transfer Starter System , midi, nitrocellulose		
1704151	Trans-Blot Turbo Cassette , 1 cassette		
1704152	Trans-Blot Turbo Base , base instrument, no cassettes included		
Description		Mini (7 x 8.5 cm)	Midi (8.5 x 13.5 cm)
Trans-Blot Turbo Transfer Pack, PVDF , pkg of 10		1704156	1704157
Trans-Blot Turbo Transfer Pack, Nitrocellulose , pkg of 10		1704158	1704159
Trans-Blot Turbo RTA Transfer Kit, Nitrocellulose , for 40 blots		1704270	1704271
Trans-Blot Turbo RTA Transfer Kit, PVDF , for 40 blots		1704272	1704273
Trans-Blot Turbo RTA Transfer Kit, LF PVDF , for 40 blots		1704274	1704275

See Also

PowerPac HC power supply: page 187.

Blotting buffers: page 252.

Trans-Blot SD Semi-Dry Transfer Cell

The Trans-Blot SD semi-dry transfer cell allows fast and efficient blotting without buffer tank or gel cassettes. Features include:

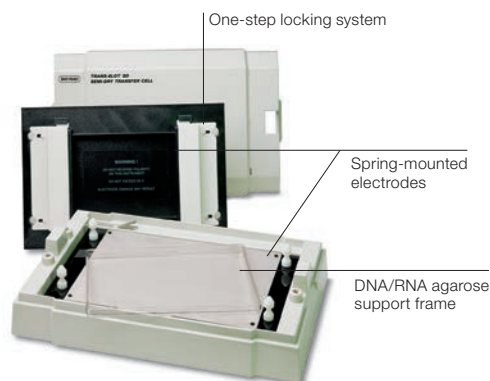
- Transfers in as little as 15–60 min
- Minimal buffer requirements
- Capacity to transfer multiple gel sizes
- Single-step locking system for simple setup
- Platinum-coated titanium anode and stainless-steel cathode plate electrodes that provide consistent and reliable transfers, durability, and years of use
- Safety cover to break the electrical current when lifted, preventing electrical shock

In addition to western blotting, the Trans-Blot SD cell can also transfer DNA and RNA using the unique agarose gel semi-dry blotting support frame. The frame protects fragile agarose gels from compression by the electrodes. Southern and northern blot transfers can be run in 10–35 minutes.

For More Information

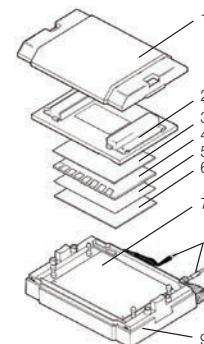
Web: bio-rad.com/transblotsd

Download bulletin: 2895



Expanded view of the Trans-Blot SD cell assembly:

1. Safety lid.
2. Cathode assembly with latches.
3. Filter paper.
4. Gel.
5. Membrane.
6. Filter paper.
7. Spring-loaded anode platform mounted on four guideposts.
8. Power cables.
9. Base.



Specifications

Maximum gel size (W x L)	24 x 16 cm
Buffer requirement	200 ml
Gel capacity	4 Mini-PROTEAN precast gels, 4 Mini-PROTEAN handcast gels, 3 Criterion gels, or 1–3 PROTEAN II gel sandwiches*
Recommended power supply	PowerPac HC
Dimensions (W x L x H)	37 x 24 x 11 cm
Weight	3.6 kg (7.9 lb)

* Dialysis membrane between each gel sandwich.

Ordering Information

Catalog #	Description
1703940*	Trans-Blot SD Semi-Dry Electrophoretic Transfer Cell , includes transfer cell, agarose gel support frame, extra thick blot paper (7 x 8.4 cm, 60 sheets; 8 x 13.5 cm, 60 sheets; 14 x 16 cm, 30 sheets; 18 x 18.5 cm, 30 sheets)
1703848	Trans-Blot SD Cell and PowerPac HC Power Supply , 100–120/220–240 V, includes #1703940 and #1645052
1703849	Trans-Blot SD Cell and PowerPac Universal Power Supply , 100–120/220–240 V, includes #1703940 and #1645070

Accessories

1703947	Cathode Plate , stainless-steel upper electrode
1703942	Anode Plate , platinum-coated lower electrode
1704019	Trans-Blot SD Agarose Gel Support Frame , includes extra thick blot paper (15 x 20 cm, 30 sheets)
1703957	Trans-Blot SD DNA/RNA Blotting Kit , includes SD agarose gel support frame, extra thick blot paper (15 x 20 cm, 30 sheets), 1 L 10x TBE buffer

* The Trans-Blot SD semi-dry transfer cell requires the use of a microprocessor-controlled power supply.

Wet/Tank Blotting Systems

Mini Trans-Blot Cell

This cell provides high-quality blotting of mini gels. A component of the Mini-PROTEAN Tetra system, the Mini Trans-Blot cell accommodates two gel holder cassettes for electrophoretic transfer of mini-format gels.

- Ability to transfer two 10 x 7.5 cm gels in just 1 hr; low-intensity overnight transfers are also possible
- Placement of wire electrodes 4 cm apart for strong electrical fields and efficient protein transfer
- Color-coded cassettes and electrodes to ensure proper orientation of the gel during transfer
- Blue cooling unit, contained within the Mini Trans-Blot cell, absorbs heat generated during rapid transfers
- Availability as either a complete stand-alone apparatus or a module compatible with the Mini-PROTEAN Tetra cell

For More Information
Download bulletin: 2033

Specifications

Maximum gel size (W x L)	10 x 7.5 cm
Buffer requirement	1.2 L
Gel capacity	2 Mini-PROTEAN handcast gels or 2 Mini-PROTEAN precast gels
Recommended power supply	PowerPac HC (PowerPac Basic is a suitable alternative)
Dimensions (W x L x H)	12 x 16 x 18 cm

Mini Trans-Blot cell components:

1. Buffer tank and lid.
2. Blue cooling unit.
3. Foam pads.
4. Gel holder cassette.
5. Electrophoresis blotting module.



See Also

PowerPac Basic and HC power supplies: page 187.
Blotting membranes: page 248.
Blot detection reagents: page 254.
Blotting buffers: page 252.

Ordering Information

Catalog #	Description
1703930	Mini Trans-Blot Electrophoretic Transfer Cell , includes 2 gel holder cassettes, 4 foam pads, modular electrode assembly, blue cooling unit, lower buffer tank, lid with cables
1703935*	Mini Trans-Blot Module , without lower buffer tank and lid
1703989	Mini Trans-Blot Cell and PowerPac Basic Power Supply , includes #1703930 and #1645050
1703836	Mini Trans-Blot Cell and PowerPac HC Power Supply , includes #1703930 and #1645052
1658029	Mini-PROTEAN Tetra Cell and Mini Trans-Blot Module , includes 10-well, 1.0 mm, 4-gel system (#1658001) and blotting module (#1703935) without lower buffer tank and lid, gel casting accessories
1658033	Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac Basic Power Supply , includes #1658001, #1703935, and #1645050
1658034	Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac Basic Power Supply , includes #1658004, #1703935, and #1645050
1658036	Mini-PROTEAN Tetra Cell for Mini Precast Gels, Mini Trans-Blot Module, and PowerPac HC Power Supply , includes #1658004, #1703935, and #1645052
1658035	Mini-PROTEAN Tetra Cell, Mini Trans-Blot Module, and PowerPac HC Power Supply , includes #1658001, #1703935, and #1645052

Accessories

1703931	Mini Gel Holder Cassette
1703932	Thick Blot Paper , 7.5 x 10 cm, for Mini Trans-Blot cassette, 50 sheets
1703933	Foam Pads , 8 x 11 cm, 4
1703812	Mini Trans-Blot Central Core
1703919	Blue Cooling Unit , for Mini-PROTEAN Tetra tanks
1703934	Bio-Ice Cooling Unit , for Mini-PROTEAN 3 tanks
1651279	Roller , 3.5" wide

* Also fits in the Mini-PROTEAN 3 electrophoresis cell.

See Also

PowerPac Basic and PowerPac HC power supplies: page 187.

Criterion precast gels: page 204.

Blotting membranes: page 248.

Blot detection reagents: page 254.

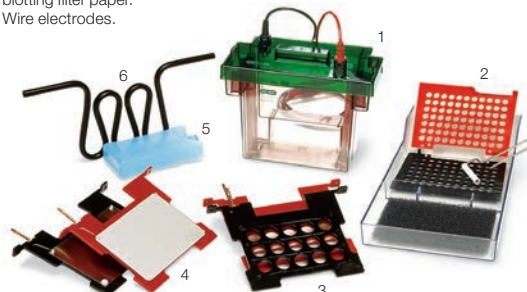
Blotting buffers: page 252.

Criterion Blotter

- Efficient transfers in 30 min to 1 hr for most proteins; overnight transfer at lower voltages is also an option
- Plate electrodes, for faster and more efficient transfers, or wire electrodes
- Included assembly tray and roller
- Sealed ice block provides sufficient cooling for most applications
- Optional cooling coil — available for applications that require precise temperature control
- Cassettes with handles for easy removal from the tank

Criterion blotter components:

1. Tank and lid.
2. Assembly tray with gel holder cassette, roller, foam pads, and blotting filter paper.
3. Wire electrodes.
4. Plate electrodes.
5. Sealed ice block.
6. Optional cooling coil.



For More Information
[Download bulletin: 2558](#)

Specifications

Maximum gel size (W x L)	15 x 9.4 cm
Buffer requirement	1.3 L
Gel capacity	4 Mini-PROTEAN precast gels, 4 mini handcast gels, or 2 Criterion precast gels
Electrode choices	Platinum-coated titanium anode and stainless-steel cathode plate electrodes,* or economical platinum wire electrodes
Recommended power supply	PowerPac HC
Dimensions (W x L x H)	21.8 x 11.8 x 15 cm

* Plate electrodes create a high-strength electrical field with higher current densities than other electrodes, producing faster and more efficient transfers.

Ordering Information

Catalog #	Description
1704070	Criterion Blotter with Plate Electrodes , includes cell assembled with plate electrodes, lid with cables, 2 Criterion gel holder cassettes, 1 pack precut blot absorbent filter paper, 4 foam pads, gel/blot assembly tray, roller, sealed ice block
1704071	Criterion Blotter with Wire Electrodes , includes cell assembled with wire electrodes, lid with cables, 2 Criterion gel holder cassettes, 1 pack precut blot absorbent filter paper, 4 foam pads, gel/blot assembly tray, roller, sealed ice block
1703872	Criterion Blotter with Plate Electrodes and PowerPac HC Power Supply , includes #1704070 and #1645052
1703874	Criterion Blotter with Wire Electrodes and PowerPac HC Power Supply , includes #1704071 and #1645052

Accessories

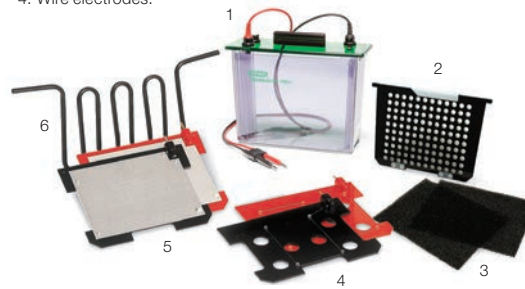
1704076	Optional Criterion Blotter Cooling Coil
1704077	Criterion Blotter Buffer Tank
1704079	Criterion Blotter Lid
1704080	Criterion Blotter Gel Holder Cassette
1704081	Criterion Blotter Platinum Anode Plate Electrode
1704082	Criterion Blotter Stainless-Steel Cathode Plate Electrode
1704083	Criterion Blotter Wire Electrode Card , anode
1704084	Criterion Blotter Wire Electrode Card , cathode
1704085	Thick Blot Paper , 9.5 x 15.2 cm, for Criterion blotter, 50 sheets
1704086	Foam Pads , 9.5 x 15.2 cm, 4
1704087	Sealed Ice Blocks , for Criterion blotter, 2
1704089	Criterion Gel/Blot Assembly Tray
1651279	Roller , 3.5" wide

Trans-Blot Cell

Features of the Trans-Blot transfer cell include:

- Ability to transfer up to 12 mini or 6 midi gels at the same time
- Plate electrodes, for faster and more efficient transfers, or wire electrodes
- Temperature regulation with the super cooling coil and a water recirculator
- A hinged gel holder cassette clamping system that eliminates slipping and ensures tight contact between the membrane and the gel
- Color-coded cassettes to ensure proper orientation in the cell

- Trans-Blot cell components:**
1. Buffer tank and lid with cables.
 2. Gel holder cassette.
 3. Foam pads.
 4. Wire electrodes.
 5. Plate electrodes.
 6. Super cooling coil.



Specifications

Maximum gel size (W x L)	16 x 20 cm
Buffer requirement	3–4 L
Gel capacity	12 Mini-PROTEAN precast gels, 12 mini handcast gels, 6 Criterion precast gels, or 3 PROTEAN II xi handcast gels
Electrode choices	Durable platinum-coated titanium anode and stainless-steel cathode plate electrodes,* or economical platinum wire electrodes
Recommended power supply	PowerPac HC
Dimensions (W x L x H)	18 x 9.5 x 24 cm

* Plate electrodes create a high-strength electrical field with higher current densities than other electrodes, producing faster and more efficient transfers.

Ordering Information

Catalog #	Description
1703939*	Trans-Blot Cell with Plate Electrodes and Super Cooling Coil , includes 2 gel holder cassettes, buffer tank, lid with power cables, 4 foam pads, 1 pack precut blot absorbent filter paper (15 x 20 cm)
1703853*	Trans-Blot Cell with Plate Electrodes, Super Cooling Coil, and PowerPac HC Power Supply , includes #1703939, #1703912, and #1645052
1703946	Trans-Blot Cell with Plate Electrodes , includes 2 gel holder cassettes, buffer tank, lid with power cables, 4 foam pads, 1 pack precut blot absorbent filter paper (15 x 20 cm)
1703850	Trans-Blot Cell with Plate Electrodes and PowerPac HC Power Supply , includes #1703946 and #1645052
1703910	Trans-Blot Cell with Wire Electrodes , includes 2 gel holder cassettes, buffer tank, lid with power cables, 4 foam pads, 1 pack precut blot absorbent filter paper (15 x 20 cm)
1703825	Trans-Blot Cell with Wire Electrodes and PowerPac HC Power Supply , includes #1703910 and #1645052

Accessories

1703914	Foam Pads , 15.5 x 20.5 cm, 6
1703956	Thick Blot Paper , 15 x 20 cm, for Trans-Blot cassette, 25 sheets
1703960	Extra Thick Blot Paper , 15 x 20 cm, 30 sheets
1703943	Trans-Blot Platinum Anode Plate Electrode
1703944	Trans-Blot Stainless-Steel Cathode Plate Electrode
1703945	Trans-Blot Plate Electrode Pair , platinum anode and stainless-steel cathode
1703920	Trans-Blot Standard Wire Electrode Card , cathode
1703921	Trans-Blot Standard Wire Electrode Card , anode
1703912	Super Cooling Coil , required for all high-intensity transfers
1703913	Gel Holder Cassette , includes 2 foam pads
1703922	Trans-Blot Cell Buffer Tank
1703923	Trans-Blot Cell Lid with Power Cables

* Trans-Blot cells require the super cooling coil for high-intensity transfers; the super cooling coil is also recommended for all applications using plate electrodes.

See Also

PowerPac HC power supply: page 187.

Precast gels: pages 198, 204.

Blotting membranes: page 248.

Blot detection reagents: page 254.

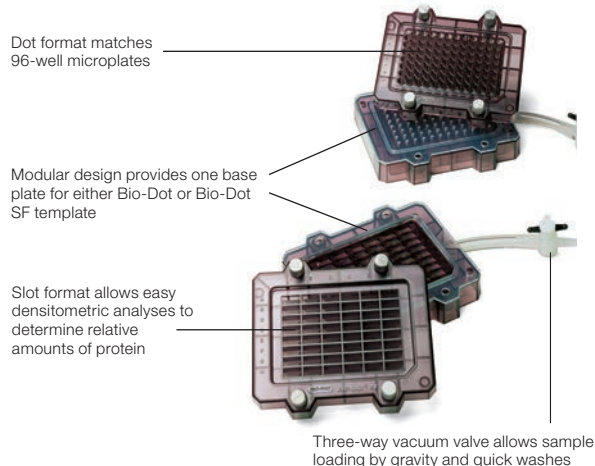
Blotting buffers: page 252.

Microfiltration and Screening Systems

Bio-Dot and Bio-Dot SF Microfiltration Apparatus

The 96-well Bio-Dot and 48-well Bio-Dot SF (slot format) microfiltration units provide easy, reproducible methods for binding proteins or nucleic acids in solution onto membranes. The Bio-Dot SF apparatus focuses sample to a thin line instead of a circle, making quantitation by densitometry more reproducible. Each is available as a complete, independent unit or as a modular template without the manifold base. Features include:

- Resistance to 100% ethanol, strong acid, and NaOH
- Autoclavability
- Sealing gasket to eliminate lateral leakage
- Easy sample application with microplate-based spacing
- Flow valve (three-way) for adjustable vacuum



Specifications

	Bio-Dot Apparatus	Bio-Dot SF Apparatus
Format	Dot blot	Slot blot
Samples	96-well, 8 x 12 format	48-well, 6 x 8 format
Sample volume	50–600 μ l	50–500 μ l
Well size	3 mm diameter	7 x 0.75 mm
Quantitation with densitometer	Yes, but Bio-Dot SF unit recommended	Yes
Overnight incubations	Yes	No
Membrane size (W x L)	12 x 9 cm	12 x 9 cm
Dimensions (W x H x D)	9 x 6.5 x 12"	9.5 x 7 x 12"
Weight	1.1 kg (2.5 lb)	1.2 kg (2.6 lb)

Ordering Information

Catalog #	Description
1703938	Bio-Dot Microfiltration System , includes Bio-Dot apparatus (#1706545) and Bio-Dot SF module (#1706543) templates, vacuum manifold base, gasket support plates, gasket
1706545	Bio-Dot Apparatus , includes Bio-Dot sample template, vacuum manifold base, gasket support plate, gasket
1706542	Bio-Dot SF Apparatus , includes Bio-Dot SF sample template, vacuum manifold base, gasket support plate, gasket, filter paper
1706543	Bio-Dot SF Module , without vacuum manifold base, for conversion of Bio-Dot to Bio-Dot SF apparatus

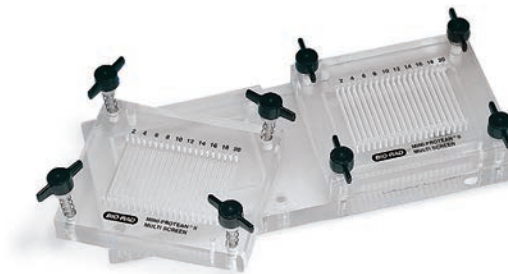
Accessories

1706546	Bio-Dot Gaskets , 3
1706544	Bio-Dot SF Gaskets , 2
1620161	Bio-Dot/Bio-Dot SF Filter Paper , 11.3 x 7.7 cm, 60 sheets

Mini-PROTEAN II Multiscreen Apparatus

Advantages of the Mini-PROTEAN II multiscreen apparatus include:

- Quick and efficient screening or filtering of up to 40 different antibodies or sera without cutting a western blot into individual strips
- Compatibility with all common western blotting procedures
- Precise side-by-side comparison of results
- Economical use of antibody samples — requires only 600 µl per channel
- Separate, detachable sample templates that accommodate one or two 8 x 7 cm blots
- Clamps that secure the blot to form 40 leakproof channels
- Molded gasket that eliminates cross-contamination between samples
- Easy operation and assembly



Specifications

Membrane size (W x L)	8 x 7 cm
Channel dimensions	2.5 mm x 5.2 cm x 5 mm
Dimensions (W x L x H)	27 x 11 x 6 cm

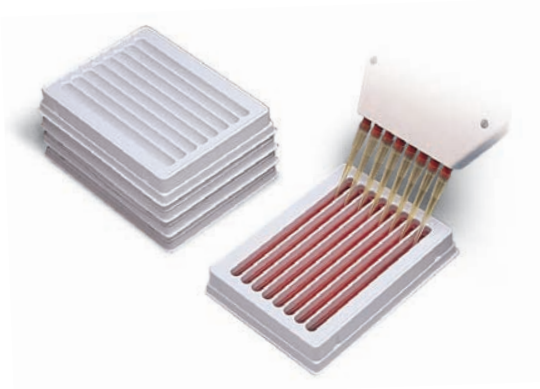
Ordering Information

Catalog #	Description
1704017	Mini-PROTEAN II Multiscreen Apparatus , includes 2 sample templates, 2 gaskets, base plate
1704018	Multiscreen Gaskets , 2

Mini Incubation Trays

Trays allow screening of antigens that have been blotted onto membranes. An entire immunological screening process can be carried out in a single tray.

- Each tray has eight 10.5 cm x 5 mm channels to accommodate strips cut from the blotted membrane. Channels align with an eight-channel pipet
- Minimal reagent volumes needed (400 µl/channel)
- Numbered channels for sample identification
- Unique ribs in the tray lid and the design of the sample channels ensure that no cross-contamination occurs



Ordering Information

Catalog #	Description
1703902	Mini Incubation Trays , 20
1703903	Mini Incubation Trays , 100

Membranes and Filter Papers

Bio-Rad offers a comprehensive line of blotting membranes including different grades of nitrocellulose, PVDF, and Zeta-Probe nylon membranes. Use the selection guide below to choose the membrane appropriate for your application.

For More Information

Web: bio-rad.com/blottingmembranes

Blotting Membrane and Filter Paper Selection Guide

Membrane	Pore Size	Binding Capacity, $\mu\text{g}/\text{cm}^2$	Compatible Detection Methods	Notes
Nitrocellulose	0.45 μm 0.2 μm	80–100	Colorimetric, chemiluminescence, chemifluorescence, radioactive	General-purpose protein blotting membrane
Supported nitrocellulose	0.45 μm 0.2 μm	80–100	Colorimetric, chemiluminescence, chemifluorescence, radioactive	Pure nitrocellulose cast on an inert synthetic support; increased strength for easier handling and for reprobing
Immun-Blot PVDF	0.2 μm	150–160	Colorimetric, chemiluminescence, radioactive	High mechanical strength and chemical stability; recommended for western blotting
Immun-Blot LF PVDF	0.45 μm	155–300	Colorimetric, chemiluminescence, chemifluorescence, fluorescence	High mechanical strength and chemical stability; low autofluorescence; recommended for western blotting using fluorescence detection
Sequi-Blot PVDF	0.2 μm	170–200	Colorimetric, radioactive	High mechanical strength and chemical stability; recommended for protein sequencing

Blotting Apparatus	Precut Membrane Sizes	Precut Filter Paper Sizes	Membrane/Filter Paper Sandwiches
Mini Trans-Blot cell	7 x 8.5 cm	7.5 x 10.5 cm	7 x 8.5 cm
Criterion blotter	8.5 x 13.5 cm	9.5 x 15.2 cm	8.5 x 13.5 cm
Trans-Blot cell	13.5 x 16.5 cm	15 x 20 cm	—
Trans-Blot Plus cell	25 x 28 cm 26.5 x 28 cm	— —	— —
Trans-Blot Turbo	7 x 8.5 cm 8.5 x 13.5 cm	7.5 x 10.5 cm 9.5 x 15.2 cm	7 x 8.5 cm 8.5 x 13.5 cm (see page 241)
Trans-Blot SD cell	7 x 8.5 cm 11.5 x 16 cm 15 x 15 cm 15 x 9.2 cm 20 x 20 cm	7 x 8.5 cm 8 x 13.5 cm 14 x 16 cm 18 x 18.5 cm —	7 x 8.5 cm 8.5 x 13.5 cm — — —
Mini-PROTEAN II multiscreen apparatus	7 x 8.5 cm 7 x 8.5 cm	7 x 8.5 cm —	7 x 8.5 cm —
Bio-Dot apparatus	9 x 12 cm	11.3 x 7.7 cm	—
Bio-Dot SF apparatus	9 x 12 cm	11.3 x 7.7 cm	—
Vacuum blotter	—	—	—

See Also

Filter paper:
page 251.

Nitrocellulose Membranes

Nitrocellulose

Nitrocellulose with the 0.45 μm pore size is recommended for most analytical blotting including protein, ssDNA, and RNA transfers. For transfer of low MW proteins (<15 kD) or nucleic acids, the 0.2 μm nitrocellulose membrane prevents sample loss due to transfer through the membrane.

Supported Nitrocellulose

Made of 100% pure nitrocellulose cast on an inert synthetic support, this nitrocellulose is a solid support for nucleic acid and protein applications and can withstand the rigors of multiple reprobing and autoclaving (121°C).



Ordering Information

Catalog #	Description	Recommended Uses
Nitrocellulose Membranes (0.2 µm)		
1620112	Nitrocellulose Membrane , 0.2 µm, 30 cm x 3.5 m, 1 roll	Transfer of low MW proteins or nucleic acids (has smaller pore size)
1620212	Nitrocellulose/Filter Paper Sandwiches , 0.2 µm, 7 x 8.4 cm, 20 pack	
1620232	Nitrocellulose/Filter Paper Sandwiches , 0.2 µm, 8.5 x 13.5 cm, 20 pack	
1620146	Nitrocellulose Membranes , 0.2 µm, 7 x 8.4 cm, 10 sheets	
1620168	Nitrocellulose Membranes , 0.2 µm, 8.5 x 13.5 cm, 10 sheets	
1620147	Nitrocellulose Membranes , 0.2 µm, 13.5 x 16.5 cm, 10 sheets	
1620150	Nitrocellulose Membranes , 0.2 µm, 20 x 20 cm, 5 sheets	
1620252	Nitrocellulose Membranes , 0.2 µm, 26.5 x 28 cm, 10 sheets	
Nitrocellulose Membranes (0.45 µm)		
1620115	Nitrocellulose Membrane , 0.45 µm, 30 cm x 3.5 m, 1 roll	Transfer of low MW antigens, immunoglobulins, glycoprotein receptor proteins, histones and nonhistones, etc.; capillary Southern blotting of ssDNA and RNA <500 bp (use Zeta-Probe membranes for blotting ssDNA and RNA of all sizes)
1620214	Nitrocellulose/Filter Paper Sandwiches , 0.45 µm, 7 x 8.4 cm, 20 pack	
1620234	Nitrocellulose/Filter Paper Sandwiches , 0.45 µm, 8.5 x 13.5 cm, 20 pack	
1620145	Nitrocellulose Membranes , 0.45 µm, 7 x 8.4 cm, 10 sheets	
1620167	Nitrocellulose Membranes , 0.45 µm, 8.5 x 13.5 cm, 10 sheets	
1620117	Nitrocellulose Membranes , 0.45 µm, 9 x 12 cm, 10 sheets	
1620114	Nitrocellulose Membranes , 0.45 µm, 15 x 9.2 cm, 10 sheets	
1620116	Nitrocellulose Membranes , 0.45 µm, 15 x 15 cm, 10 sheets	
1620113	Nitrocellulose Membranes , 0.45 µm, 20 x 20 cm, 5 sheets	
1620251	Nitrocellulose Membranes , 0.45 µm, 26.5 x 28 cm, 10 sheets	
Supported Nitrocellulose Membranes (0.2 µm)		
1620097	Supported Nitrocellulose Membrane , 0.2 µm, 30 cm x 3 m, 1 roll	Protein and nucleic acid blotting
Supported Nitrocellulose Membranes (0.45 µm)		
1620094	Supported Nitrocellulose Membrane , 0.45 µm, 30 cm x 3 m, 1 roll	Protein and nucleic acid blotting

PVDF Membranes

The chemically resistant PVDF membrane has very high protein binding capacity and resistance to tearing and cracking, even after repeated stripping and reprobing.

Immun-Blot PVDF for Western Blotting

This membrane is ideal for chemiluminescent and colorimetric western blots because it retains target protein very strongly but reduces nonspecific protein binding that can obscure high-sensitivity detection. Binding capacity is 150–160 µg/cm². The pore size of this membrane is 0.45 µm.

Sequi-Blot PVDF for Protein Sequencing

This membrane gives outstanding performance in protein sequencing, even for low-abundance samples. Sequi-Blot PVDF retains all transferred protein and has a binding capacity of 170–200 µg/cm². The pore size of this membrane is 0.2 µm.

Immun-Blot Low Fluorescence PVDF Membrane

Optimized for fluorescence applications, the low fluorescence property of the membrane enhances image quality and improves sensitivity of all fluorescence detection protocols. It is ideal for multiplex, fluorescence western blotting, and chemifluorescence applications. The membrane is also compatible with other detection methods such as chemiluminescence and colorimetric detection. This membrane is highly recommended for the V3 Western Workflow.

For More Information

Web: bio-rad.com/v3

Download bulletins: 2212 and 6116

Ordering Information

Catalog #	Description
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Immun-Blot PVDF Membranes

1620177	Immun-Blot PVDF Membrane , 26 cm x 3.3 m, 1 roll
1620218	Immun-Blot PVDF/Filter Paper Sandwiches , 7 x 8.4 cm, 20 pack
1620238	Immun-Blot PVDF/Filter Paper Sandwiches , 8.5 x 13.5 cm, 20 pack
1620174	Immun-Blot PVDF Membranes , 7 x 8.4 cm, 10 sheets
1620175	Immun-Blot PVDF Membranes , 10 x 15 cm, 10 sheets
1620176	Immun-Blot PVDF Membranes , 20 x 20 cm, 10 sheets
1620255	Immun-Blot PVDF Membranes , 25 x 28 cm, 10 sheets

Sequi-Blot PVDF Membranes

1620184	Sequi-Blot PVDF Membrane , 26 cm x 3.3 m, 1 roll
1620217	Sequi-Blot PVDF/Filter Paper Sandwiches , 7 x 8.5 cm, 50 sheets

Immun-Blot Low-Fluorescence PVDF Membranes

1620260	Low Fluorescence PVDF/Filter Paper Sandwiches , 7 x 8.5 cm, 10 pack
1620261	Immun-Blot Low Fluorescence PVDF/Filter Paper , 0.45 μ m, 7 x 8.5 cm, 20 pack
1620263	Immun-Blot Low Fluorescence PVDF/Filter Paper , 0.45 μ m, 8.5 x 13.5 cm, 20 pack
1620262	Low Fluorescence PVDF/Filter Paper Sandwiches , 8.5 x 13.5 cm, 10 pack
1620264	Low Fluorescence PVDF Roll , 28 x 3.8 m, 1 roll

Zeta-Probe Membranes

Zeta-Probe membranes bind nucleic acids independently of buffer pH, so they can be used in traditional Southern blots, rapid alkaline Southern and northern blotting techniques, and electrophoretic transfer of nucleic acids from agarose and polyacrylamide gels. Zeta-Probe membranes can be hybridized and stripped as many as 20 times for DNA (Li et al. 1987) and six times for RNA (Gatti et al. 1984). Oligonucleotides as short as six bases will bind to the membrane and oligonucleotides ≥ 20 bases long will be retained after repeated hybridization and washing.

Ordering Information

Catalog #	Description
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1620159	Zeta-Probe Membrane , 30 cm x 3.3 m, 1 roll
1620165	Zeta-Probe Membrane , 20 cm x 3.3 m, 1 roll

Filter Paper

Bio-Rad offers a range of filter papers for blotting applications, including filter paper precut to fit standard gel sizes.

Ordering Information

Catalog #	Description	Recommended Uses
Blot Absorbent Filter Paper (Extra Thick)		
1703965	Extra Thick Blot Paper , 7.5 x 10 cm, for Mini-PROTEAN Tetra gels, 60 sheets	All blotting applications using the Trans-Blot SD cell or Trans-Blot cell (precut to gel dimensions from well to bottom of gel)
1703966	Extra Thick Blot Paper , 7 x 8.4 cm, for Mini-PROTEAN Tetra gels, 60 sheets	
1703967	Extra Thick Blot Paper , 8 x 13.5 cm, for Criterion precast gels, 60 sheets	
1703968	Extra Thick Blot Paper , 14 x 16 cm, for PROTEAN II xi gels, 30 sheets	
1703969	Extra Thick Blot Paper , 19 x 18.5 cm, for PROTEAN II XL gels, 30 sheets	
1703958	Extra Thick Blot Paper , 10 x 15 cm, 30 sheets	
1703959	Extra Thick Blot Paper , 15 x 15 cm, 30 sheets	
1703960	Extra Thick Blot Paper , 15 x 20 cm, 30 sheets	
Blot Absorbent Filter Paper (Thick)		
1703932	Thick Blot Paper , 7.5 x 10 cm, for Mini Trans-Blot cassette, 50 sheets	All blotting applications requiring thick, high wet strength filter paper
1704085	Thick Blot Paper , 9.5 x 15.2 cm, for Criterion blotter, 50 sheets	
1703955	Thick Blot Paper , 14 x 16 cm, for PROTEAN II xi gels, 25 sheets	
1703956	Thick Blot Paper , 15 x 20 cm, for Trans-Blot cassette, 25 sheet	
1620161	Bio-Dot/Bio-Dot SF Filter Paper , 7.7 x 11.3 cm, 60 sheets	
Blot Absorbent Filter Paper (Thin)		
1620118	Thin Blot Paper , 33 cm x 3 m, 1 roll	All blotting applications requiring thin, high wet strength filter paper

Blotting Stains and Tracking Dyes

Bio-Rad offers a selection of stains for blotting applications; see page 260. Tracking dyes can be found on page 272.

Blotting Buffers and Blocking Reagents

New EveryBlot Blocking Buffer

Proper blocking of membranes before immunodetection is critical for reducing nonspecific binding. An effective blocker minimizes background and allows sensitive detection of target proteins.

EveryBlot blocking buffer benefits include:

- Complete blocking in 5 min
- Compatible with all detection methods and can be used for detection of phosphorylated targets
- Low background and high signal on fluorescent and chemiluminescent blots

For More Information

Web: bio-rad.com/everyblot

Request or download bulletin: 7185



Ordering Information

Catalog #	Description
12010020	EveryBlot Blocking Buffer , 500 ml, high performance blocking buffer for all western blots; blocks in 5 min
12010947	EveryBlot Blocking Buffer Trial Size , 50 ml, high performance blocking buffer for all western blots; blocks in 5 min

Premixed Blotting Buffers and Buffer Reagents

Two transfer buffers are available: 10x Tris/glycine and 10x Tris/CAPS. Premixed blocking buffers, available as 1x PBS with casein and 1x TBS with casein, take the time and effort out of solubilizing casein. Bio-Rad offers a complete line of reagents for preparation of buffers to your own specifications.

Blotting Buffer Selection Guide

	1x Formulation	Applications
Transfer Buffers*		
10x Tris/glycine	25 mM Tris, 192 mM glycine, pH 8.3	Western blotting
10x Tris/CAPS	Anode buffer: 60 mM Tris, 40 mM CAPS, 15% methanol, pH 9.6 Cathode buffer: 60 mM Tris, 40 mM CAPS, 0.1% (w/v) SDS, pH 9.6	A discontinuous buffer system that increases transfer efficiency in semi-dry applications
Processing Buffers		
10x PBS	10 mM sodium phosphate, 150 mM NaCl, pH 7.4	Western blotting wash solution
10x TBS	20 mM Tris, 500 mM NaCl, pH 7.4	Western blotting wash solution
1x PBS with 1% casein	10 mM sodium phosphate, 150 mM NaCl, 1% (w/v) casein, pH 7.4	Western blotting blocking buffer (casein blockers recommended for all applications, including those with biotin-avidin complexes)
1x TBS with 1% casein	20 mM Tris, 500 mM NaCl, 1% (w/v) casein, pH 7.4	Western blotting blocking buffer (casein blockers recommended for all applications, including those with biotin-avidin complexes)

* These buffers can be used for all gel types and formulations.

Ordering Information

Catalog #	Description	Catalog #	Description
Blot Transfer and Processing Buffers		Detergents and Blocking Buffers	
1610734	10x Tris/Glycine, 1 L	1706537	Gelatin, EIA grade, 200 g
1610771	10x Tris/Glycine, 5 L cube	1706404	Blotting-Grade Blocker, nonfat dry milk, 300 g
1610778	10x Tris/CAPS, 1 L	1706531	Tween 20, EIA grade, 100 ml
1610780	10x Phosphate Buffered Saline, 1 L	1610781	10% (w/v) Tween 20, for easy pipetting, 1 L
1706435	10x Tris Buffered Saline, 1 L	1610418	SDS Solution, 20% (w/v), 1 L
		1610783*	1x Phosphate Buffered Saline with 1% Casein, 1 L
		1610782*	1x Tris Buffered Saline with 1% Casein, 1 L
Reagents			
1610610**	Dithiothreitol (DTT), 1 g	1610710	2-Mercaptoethanol, 25 ml
1610611**	Dithiothreitol (DTT), 5 g	1632101	Tributylphosphine (TBP), 200 mM, 0.6 ml
1610729	EDTA, 500 g	1610713	Tricine, 500 g
1706537	Gelatin, EIA grade, 200 g	1610716	Tris, 500 g
1610717	Glycine, 250 g	1610719	Tris, 1 kg
1610718	Glycine, 1 kg	1610730	Urea, 250 g

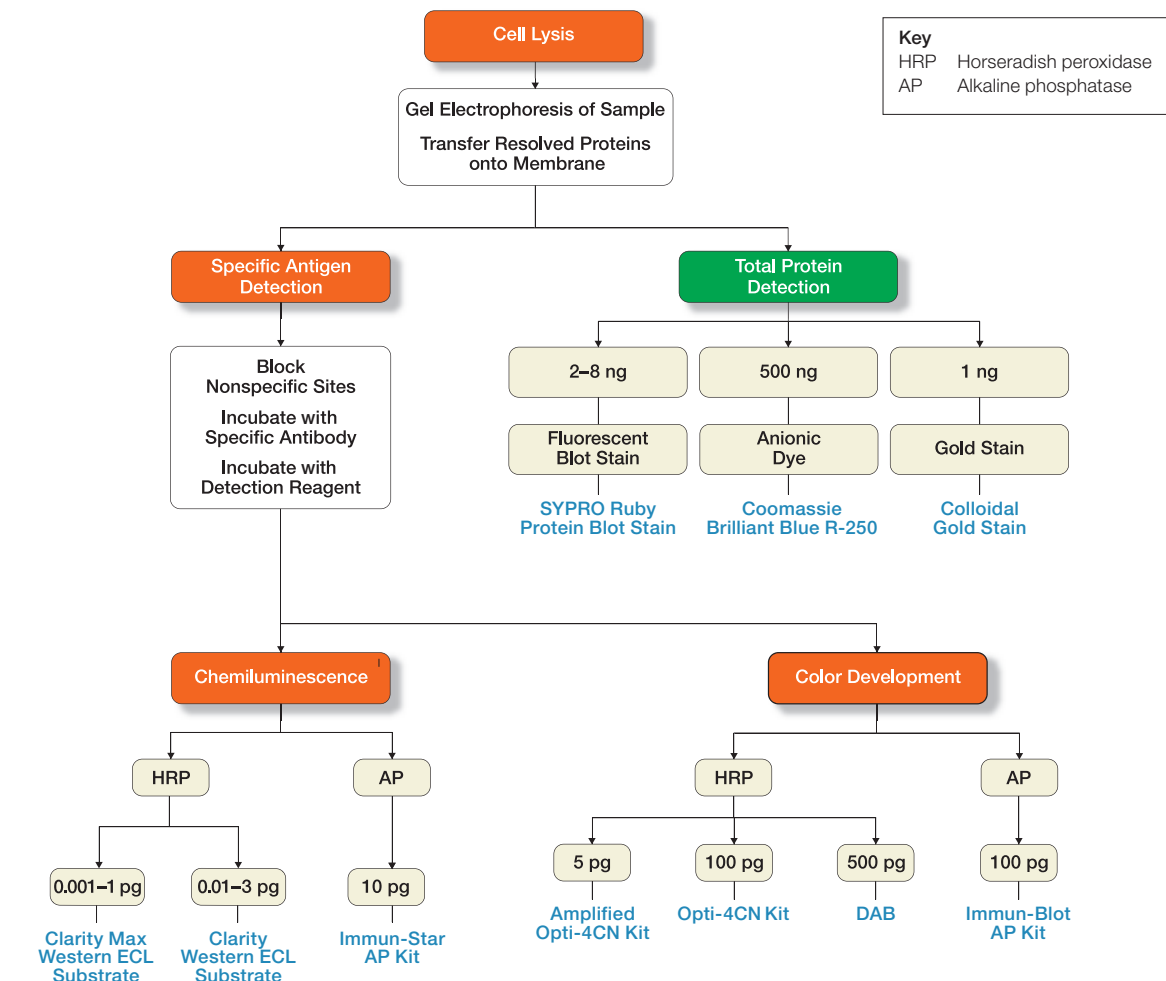
* Store at 2–8°C.

** Store desiccated at 2–8°C; store other reagents at room temperature, dry, and away from direct sunlight. Hazardous shipping charges may apply.

Immunodetection Reagents and Kits

The most common blot detection techniques use antibodies to either probe for specific antigens in a complex protein sample or stain all proteins bound to a membrane. The chart indicates the maximum sensitivity achievable with each detection system.

For more information on methods, equipment, and reagents used in protein blotting, download the Protein Blotting Guide (bulletin 2895).



Blot detection reagent selection guide.

Chemiluminescence Detection

Chemiluminescent western blot detection offers highly sensitive detection of proteins bound to blotting membranes. Most specific antigen detection methods are based on HRP (horseradish peroxidase) or AP (alkaline phosphatase) secondary antibody conjugates. The signal can be captured with film or dedicated imaging equipment (see page 298).

Chemiluminescence-Based Kit Selection Guide

	Clarity Western ECL	Clarity Max Western ECL	Immun-Star AP
Lower detection limit	Mid femtogram	Low femtogram	10 pg
Signal duration	24 hr	2 hr	24 hr
Primary detection method	Digital imager and film	Digital imager and film	Film
Suggested antibody dilution	Primary: 1:1,000–1/50,000 Secondary: 1:50,000–1/250,000	Primary: 1:1,000–1/50,000 Secondary: 1:50,000–1/250,000	Primary: 1:1,000–1/6,000 Secondary: 1:3,000
Recommended membrane	Nitrocellulose, PVDF, or LF PVDF	Nitrocellulose, PVDF, or LF PVDF	Nitrocellulose, PVDF, or LF PVDF

Clarity and Clarity Max Western ECL Substrates

Clarity Western ECL Substrate

Clarity Western ECL substrate is compatible with any HRP-conjugate secondary detection reagent and ideal for both digital and film-based imaging. The Clarity substrate provides excellent sensitivity with an extremely long signal duration that allows re-imaging without loss of signal. Features include:

- Low background levels, yielding very clear images
- Bright, long signal
- Shelf life of 12 months at room temperature

Clarity Max Western ECL Substrate

Clarity Max western ECL substrate is our brightest ECL substrate, providing additional sensitivity when you need it most. Clarity Max is perfect for blots involving low-abundance or otherwise difficult-to-detect targets. This ECL substrate completes our western ECL substrate offering and fits right into your current western blotting process. Use it in place of your current ECL substrate when you need additional sensitivity. Features include:

- Room temperature storage
- Low–femtogram level sensitivity
- Compatibility with HRP conjugates



Clarity and Clarity Max Western ECL Substrates

For More Information
 Web: bio-rad.com/clarity
 Request or download bulletin: 6305

Ordering Information

Catalog #	Description
1705060	Clarity Western ECL Substrate , 200 ml size contains Clarity western peroxide reagent, 100 ml, and Clarity western luminol/enhancer reagent, 100 ml
1705061	Clarity Western ECL Substrate , 500 ml size contains Clarity western peroxide reagent, 250 ml, and Clarity western luminol/enhancer reagent, 250 ml
1705062	Clarity Max Western ECL Substrate , 100 ml, contains 50 ml Clarity Max western peroxide reagent and 50 ml Clarity Max western luminol/enhancer reagent

Immun-Star AP Chemiluminescence Kits

These kits combine Bio-Rad's blotting reagents and CDP-Star chemiluminescence technology. Exposure times on film are typically between 30 seconds and 5 minutes, depending on sample amount and antibody specificity. Immun-Star AP kit features include:

- The ability to reactivate a blot, even weeks later, with the addition of fresh chemiluminescent substrate
- Detection of as little as 10 pg of protein
- Stable light signal duration of 24 hr
- Ability to strip and reprobe

Choose from two kits based on goat anti-mouse or goat anti-rabbit conjugates.



For More Information

Web: bio-rad.com/blotdetection

Download bulletin: 2050

Ordering Information

Catalog #	Description	Substrate	Enhancer*	Antibody
Immun-Star AP Kits** and Components				
1705010	GAM-AP Detection Kit	•	•	•
1705011	GAR-AP Detection Kit	•	•	•
1705018	AP Substrate, 125 ml	•		
1705012	AP Substrate Pack	•	•	

* The enhancer is used on nitrocellulose blots but is not optimized for PVDF blots. Additional testing is recommended to determine appropriate conditions for PVDF blots.

** GAM, goat anti-mouse; GAR, goat anti-rabbit.

Colorimetric Detection

Enzymes such as HRP or AP convert several substrates to a colored precipitate. As the precipitate accumulates on the blot, a colored signal develops. The reaction can be monitored and stopped when the desired signal over background is observed. Colorimetric detection is easier to perform than film-based chemiluminescence detection; however, the method's single end-point result does not allow multiple exposures of chemiluminescent methods. Colorimetric detection is typically considered a medium-sensitivity method compared to radioactive or chemiluminescence detection. However, Bio-Rad offers amplified colorimetric systems that provide high sensitivity comparable to or exceeding that of chemiluminescent detection.

For More Information

Web: bio-rad.com/blotdetection

Colorimetric HRP Detection

Bio-Rad offers three types of kits based on the detection reagent 4-chloro-1-naphthol (4CN) for colorimetric HRP detection; individual reagents are also available, including 3,3'-diaminobenzidine (DAB), an alternative reagent.

For More Information

Download bulletin: 2260



Opti-4CN Substrate and Detection Kits

Detection sensitivity using 4CN is about 500 pg of antigen, with the benefit of very low background. The Opti-4CN kit improves detection sensitivity over that of 4CN, to 100 pg, with no additional steps required.

Amplified Opti-4CN Substrate and Detection Kits

Amplified Opti-4CN detection kits are based on proprietary HRP-activated amplification reagents from Bio-Rad. These kits allow colorimetric detection to 5 pg, which is comparable to chemiluminescence detection sensitivity. No additional materials or special equipment are required.

Immun-Blot HRP Assay Kits

Immun-Blot HRP assay kits provide the reagents required to perform standard HRP/4CN colorimetric detection on western blots with the added convenience of premixed buffers and enzyme substrates. All kit components are individually tested for quality control in blotting applications.

Premixed and Individual HRP Colorimetric Substrates

Premixed enzyme substrate kits are convenient and reliable and reduce exposure to hazardous reagents used in the color development of western blots.

Ordering Information

Catalog #	Description
Opti-4CN Kits*	
1708235	Opti-4CN Substrate Kit
1708236	Opti-4CN Goat Anti-Rabbit Detection Kit
1708237	Opti-4CN Goat Anti-Mouse Detection Kit
Amplified Opti-4CN Kits*	
1708238	Amplified Opti-4CN Substrate Kit
1708240	Amplified Opti-4CN Goat Anti-Mouse Detection Kit
1708239	Amplified Opti-4CN Goat Anti-Rabbit Detection Kit
Immun-Blot HRP Assay Kits, with 4CN**	
1706463	Goat Anti-Rabbit IgG (H + L)-HRP Assay Kit
1706464	Goat Anti-Mouse IgG (H + L)-HRP Assay Kit
1706465	Goat Anti-Human IgG (H + L)-HRP Assay Kit
Premixed Substrate Reagents	
1706431	HRP Conjugate Substrate Kit, contains premixed 4CN, hydrogen peroxide solutions, color development buffer; makes 1 L color development solution
Individual Blotting Substrates	
1706534	HRP Color Development Reagent, 4CN, 5 g
1706535	HRP Color Development Reagent, DAB, 5 g

Opti-4CN Kits***Amplified Opti-4CN Kits*****Immun-Blot HRP Assay Kits, with 4CN******Premixed Substrate Reagents****Individual Blotting Substrates**

* Each kit contains enough reagent for 2,500 cm² of membrane or approximately 50 mini blots.

** Kits contain 0.5 ml of specific HRP blotting-grade conjugate; each kit provides reagents (blotting-grade TBS buffer, Tween 20 detergent, gelatin blocking reagent, and 4CN substrate solution) for 200 assays on a 0.6–0.8 x 9.2 cm nitrocellulose strip using a total volume of 5.0 ml.

Colorimetric AP Detection

Immun-Blot AP Assay Kits

A common substrate for colorimetric detection on western blots based on AP-conjugated secondary antibodies is 5-bromo-4-chloro-3-indolyl phosphate/nitroblue tetrazolium (BCIP/NBT). Immun-Blot AP assay kits provide the essential reagents to perform colorimetric detection (of up to 100 pg of protein) based on AP and BCIP/NBT with the added convenience of premixed buffers and enzyme substrates. All kit components are individually tested for quality control in blotting applications.

Premixed AP Colorimetric Substrates

Premixed enzyme substrate kits provide convenience and reliability and reduce exposure to hazardous reagents.

For More Information

Web: bio-rad.com/blotdetection

Download bulletins: 1600 and 2032



Ordering Information

Catalog #	Description
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Opti-4CN Kits*

1706460	Goat Anti-Rabbit IgG (H + L)-AP Assay Kit
1706461	Goat Anti-Mouse IgG (H + L)-AP Assay Kit
1706462	Goat Anti-Human IgG (H + L)-AP Assay Kit

Premixed Substrate Reagents

1706432	AP Conjugate Substrate Kit, contains premixed BCIP and NBT solutions and color development buffer; makes 1 L color development solution
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* Kits contain 0.5 ml of specific AP blotting-grade conjugate; each kit provides reagents (blotting grade TBS buffer, Tween 20 detergent, gelatin blocking reagent, and BCIP and NBT substrate solution) for 200 assays on a 0.6–0.8 x 9.2 cm nitrocellulose strip using a total volume of 5.0 ml.

Western Blot Conjugates and Reagents

Blotting-Grade Conjugates and Reagents

Protein A and Protein G Conjugates

Proteins A and G are bacterial cell surface proteins that bind to the Fc region of IgG molecules. Each reagent has different IgG binding capabilities, depending on the species of origin of the immunoglobulin.

Blotting-Grade Reagents

Detergents and blocking reagents for western blotting are available individually.

Primary Antibodies

For our selection of primary antibodies for western blotting and other applications, see page 286.

Secondary Antibodies

For our wide range of secondary antibodies for western blotting, ELISA, IHC, IF, and flow cytometry, see page 291.

For More Information

Web: bio-rad.com/blotdetection

Binding Specificities of Protein A and Protein G Conjugates

Immunoglobulin	Protein A	Protein G	Immunoglobulin	Protein A	Protein G
Human IgG ₁	•	•	Mouse IgG _{2b}	•	•
Human IgG ₂	•	•	Mouse IgG ₃	•	•
Human IgG ₃	—	•	Rat IgG ₁	◦	◦
Human IgG ₄	•	•	Rat IgG _{2a}	—	•
Mouse IgG ₁	◦ / —	◦	Rat IgG _{2b}	—	◦
Mouse IgG _{2a}	•	•	Rat IgG _{2c}	•	•

• Strong binding. ◦ Weak binding. — No binding.

Conjugate Specifications*

Products	Volume, ml	Recommended Dilution	Products	Volume, ml	Recommended Dilution
Immun-Star GAR	2	1:10,000	Goat anti-rabbit IgG-AP	1	1:3,000
Immun-Star GAM	2	1:10,000	Goat anti-mouse IgG-AP	1	1:3,000
Avidin-HRP	2	1:1,000–1:3,000	Goat anti-human IgG-AP	1	1:3,000
Goat anti-rabbit (H + L)	2	1:3,000	Avidin-AP	1	1:1,000–1:3,000
Goat anti-mouse (H + L)	2	1:3,000	Biotinylated-AP	1	1:3,000
Goat anti-human (H + L)	2	1:3,000	Biotinylated-GAR (H + L), human IgG adsorbed	1	1:3,000
Protein A-HRP	1	1:3,000			
Protein G-HRP	1	1:3,000			

* Shelf life of conjugates is one year when stored at 4°C.

Ordering Information

Catalog #	Description	Catalog #	Description
Blotting-Grade Conjugates, HRP			
1705046	Immun-Star Goat Anti-Rabbit (GAR)-HRP , lyophilized	1706522	Protein A-HRP , 1 ml
1705047	Immun-Star Goat Anti-Mouse (GAM)-HRP , lyophilized	1706425	Protein G-HRP , 1 ml
1706515	Goat Anti-Rabbit IgG (H + L)-HRP , 2 ml	1706528	Avidin-HRP , 2 ml
1706516	Goat Anti-Mouse IgG (H + L)-HRP , 2 ml		
1721050	Goat Anti-Human IgG (H + L)-HRP , 2 ml		
Blotting-Grade Conjugates, AP			
1706518	Goat Anti-Rabbit IgG-AP , 1 ml	1706521	Goat Anti-Human IgG-AP , 1 ml
1706520	Goat Anti-Mouse IgG-AP , 1 ml	1706403	Biotinylated AP , 1 ml
Detergents and Blocking Reagents			
1706537	Gelatin , EIA grade, 200 g	1610418	SDS Solution , 20% (w/v), 1 L
1706404	Blotting-Grade Blocker , nonfat dry milk, 300 g	1610783*	1x Phosphate Buffered Saline with 1% Casein , 1 L
1706531	Tween 20 , EIA grade, 100 ml	1610782*	1x Tris Buffered Saline with 1% Casein , 1 L
1610781	10% Tween 20 , for easy pipetting, 1 L		

* Store at 2–8°C.

Total Protein Blot Detection

Bio-Rad offers three stain options for total protein detection. For electrophoresis stains, see page 225.

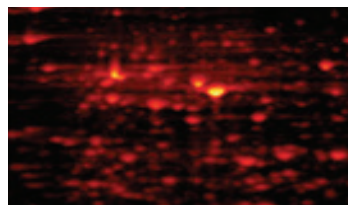
Total Protein Stains

Comparison of Total Protein Staining Methods

Stain	Sensitivity	Staining Time	Advantages	Disadvantages
SYPRO Ruby protein blot stain	2–8 ng	<1 hr	Mass spectrometry compatible	UV fluorescence detection system required
Coomassie Brilliant Blue R-250	100–1,000 ng	~1 hr	Inexpensive, rapid stain	Low sensitivity, shrinks nitrocellulose membranes
Colloidal gold total protein stain	1 ng	~2 hr	Very sensitive, rapid stain	High background with nylon membranes

SYPRO Ruby Protein Blot Stain

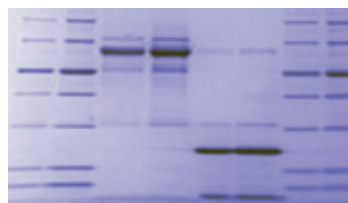
SYPRO Ruby protein blot stain provides highly sensitive detection of proteins on PVDF or nitrocellulose membranes. After staining, target proteins can be detected by colorimetric or chemiluminescence immunostaining or analyzed by microsequencing or mass spectrometry with no interference from the stain.



SYPRO Ruby protein gel stain.

Coomassie Brilliant Blue R-250 Dye

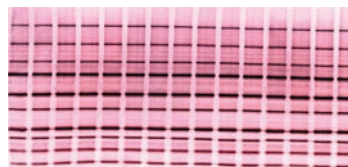
Coomassie Brilliant Blue R-250 is an anionic dye used for staining gels and membranes (PVDF and nitrocellulose). It is a rapid and inexpensive stain that can detect nanogram levels of protein. Since this dye can interfere with antibody binding sites, subsequent detection of proteins by immunostaining is not recommended.



Coomassie Brilliant Blue stain.

Colloidal Gold Total Protein Stain

Colloidal gold total protein stain is a stabilized gold stain optimized for rapid and sensitive identification of proteins bound to nitrocellulose membranes (Rohringer and Holden 1985). Protein bands stain dark red following incubation of the membrane with colloidal gold solution. The stained membrane yields a permanent record of the protein pattern for exact comparison to immunostained results. Colloidal gold total protein stain is provided ready to use.



Colloidal gold total protein stain.

For More Information

Web: bio-rad.com/totalprotein

Ordering Information

Catalog #	Description
1703127	SYPRO Ruby Protein Blot Stain, 200 ml
1610400	Coomassie Brilliant Blue R-250, 10 g
1706527	Colloidal Gold Total Protein Stain, 500 ml

Nucleic Acid Electrophoresis and Blotting

Bio-Rad offers a wide range of nucleic acid electrophoresis and blotting tools for life science research — from molecular ladders to mutation detection systems. Different system formats and sizes are available to accommodate a variety of application needs.

 [Learn More about the Technology](#)
Web: bio-rad.com/tech/DNAelectro

DNA Electrophoresis Systems

Bio-Rad offers a complete line of easy-to-use horizontal agarose gel electrophoresis systems, varying in length and width, for both low- and high-throughput applications. Submerged horizontal electrophoresis cells include three models that can run precast or handcast gels:

- Mini-Sub Cell GT cell
- Wide Mini-Sub Cell GT cell
- Sub-Cell GT cell

And two models configured to run ReadyAgarose precast gels:

- Mini ReadySub-Cell GT cell
- Wide mini ReadySub-Cell GT cell

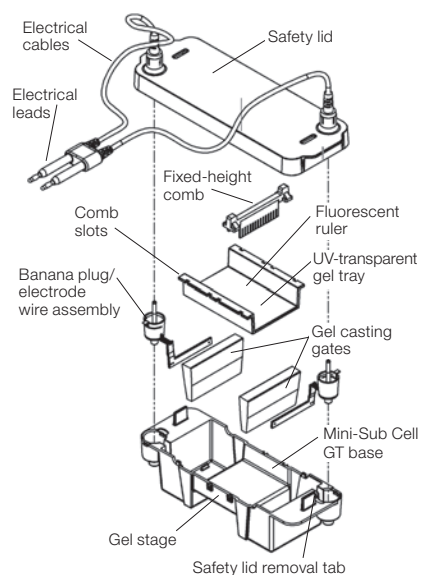
Key features of the Sub-Cell family include:

- UV-transparent gel trays with an integrated fluorescent ruler
- Multiple options for hand casting gels of different sizes
- Combs to fit virtually every need
- Clear plastic construction for easy sample visualization
- Buffer recirculation ports for applications that require high voltages or extended runs
- Easy-to-replace electrode cassettes
- IEC 1010 (EN 61010) electrical safety certification

For More Information

Web: bio-rad.com/subcell

Request or download bulletin: 2660



Components of the Mini-Sub Cell GT cell.

See Also

Certified agaroses:
page 274.

PowerPac Basic
power supply:
page 187.

DNA ladders:
page 275.

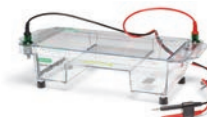
Premixed running
buffers: page 273.

Nucleic acid reagents:
page 272.

Gel documentation
systems: page 298.

ReadyAgarose
precast gels:
page 267.

Sub-Cell Family Selection Guide



	Mini-Sub Cell GT and Mini ReadySub-Cell GT*	Wide Mini-Sub Cell GT and Wide Mini ReadySub-Cell GT**	Sub-Cell GT
Cell size, cm (W x L x H)	9.2 x 25.5 x 5.6	17.8 x 25.5 x 6.8	18 x 40.5 x 9.4
Gel tray sizes, cm (W x L)	7 x 7 7 x 10	15 x 7 15 x 10	15 x 10 15 x 15 15 x 20 15 x 25
ReadyAgarose gels accommodated	Yes (mini format: 8-, 12-, 2 x 8-well)	Yes (wide mini format: 20-, 32-, 2 x 32-well; 96 Plus format: 4 x 26-well)	No
Sample throughput	8–30***	10–60***	1–120†
Base buffer volume, L	~0.27	~0.65	~1.0
Distance to electrode, cm	14.5	14.5	29.5
Bromophenol blue migration at 75 V	~4.5 cm/hr	~4.5 cm/hr	~3.0 cm/hr

* The mini ReadySub-Cell GT cell is a Mini-Sub Cell GT cell dedicated to running ReadyAgarose precast gels, gel size 7 x 10 cm; sample throughput is 8-, 12-, or 2 x 8-well. This cell does not include casting gates, tray, or combs.

** The wide mini ReadySub-Cell GT cell is a wide Mini-Sub Cell GT cell dedicated to running ReadyAgarose precast gels, gel size 15 x 10 cm; sample throughput is 20-, 32-, 2 x 32-, or 4 x 26-well. This cell does not include casting gates, tray, or combs.

*** Sample throughput value assumes 1–2 combs per gel.

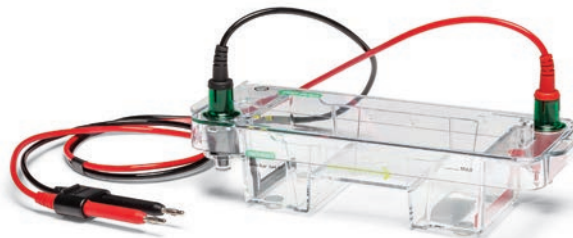
† Sample throughput value assumes 1–4 combs per gel.

Mini-Sub Cell GT Cells

The redesigned Mini-Sub Cell GT cell offers updated features that make electrophoresis even easier. A Mini-Sub Cell GT cell can resolve up to 30 samples. Its short, narrow format allows 7 and 10 cm runs with speed, simplicity, and economy. These cells resolve EcoRI or HindIII digests of lambda phage DNA in only 1.5 hours at 60 V. Small DNA fragments can be separated in as little as 15 minutes at 150 V. All mini cells accommodate ReadyAgarose precast gels and include a buffer tank, safety lid with cables, and leveling bubble.

The mini ReadySub-Cell GT cell (#1704487) is identical to the Mini-Sub Cell GT cell, except it is dedicated to running mini ReadyAgarose precast gels. This cell does not include casting gates, tray, or combs. These components are available to upgrade the ReadySub-Cell GT cell for handcasting capability.

For More Information
Web: bio-rad.com/subcell



Ordering Information

Catalog #	UV-Transparent Tray, cm		Combs		Mini Casting Gates	Mini Gel Caster	PowerPac Basic Power Supply (#1645050)
	7 x 7*	7 x 10	8-Well	15-Well			
Mini-Sub Cell GT Systems**							
1704406	•		•	•	•		
1704486	•		•	•	•	•	
1640300		•	•	•		•	•
1704467		•	•	•		•	
1704466		•	•	•			
1704487							

Catalog # Description

Mini-Sub Cell GT Accessories

1704491	Mini-Sub Cell GT Handcasting Kit , includes 7 x 7 cm UV-transparent tray, casting gates, 8- and 15-well 1.5 mm fixed-height combs
1704422	Mini-Sub Cell GT Gel Caster , for Mini-Sub Cell GT and wide Mini-Sub Cell GT systems
1704436*	Mini-Sub Cell GT UV-Transparent Gel Tray , 7 x 7 cm (trays have 2 slots for fixed-height combs)
1704435	Mini-Sub Cell GT UV-Transparent Gel Tray , 7 x 10 cm (trays have 2 slots for fixed-height combs)
1704330**	Original UV-Transparent Mini-Gel Tray , 7 x 10 cm
1704434	Mini-Sub Cell GT Casting Gates
1704362	Mini-Sub Cell GT Anode (Red) QuickSnap Electrode Assembly
1704363	Mini-Sub Cell GT Cathode (Black) QuickSnap Electrode Assembly

Catalog #	# of Wells	Height†	Thickness, mm	Width of Well, mm	Length of Teeth, mm	Volume, µl (in 5 mm deep gel)
Combs for Mini-Sub Cell GT Systems						
1704464	15	Fixed	0.75	3	10	11.25
1704465***	15	Fixed	1.5	3	10	22.5
1704332	15	Adjustable	1.0	2.6	10.2	13.0
1704462	8	Fixed	0.75	5.5	11.0	20.0
1704463***	8	Fixed	1.5	5.5	11.0	40.0
1704333	8	Adjustable	1.0	5.5	10.2	27.5
1704461	2 preparative	Fixed	1.5	20.0	10	150
	2 reference			4.0		30.0
1704460	1 preparative	Fixed	1.5	44	10.2	330
	2 reference			3.0		22.5

* Allows casting gels in the cell using casting gates; 7 x 10 cm gels can be cast with a gel caster.

** Mini-Sub Cell systems purchased before 1996 (Mini-Sub DNA cell) require casting tray #1704330. This tray is not compatible with the Mini-Sub Cell GT system.

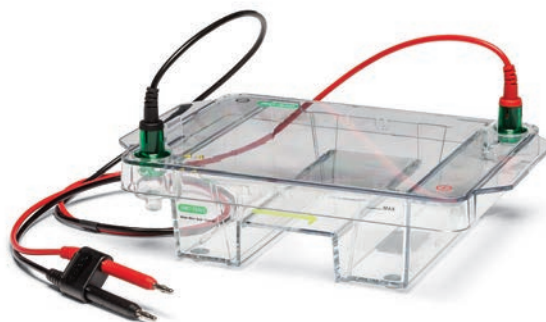
*** Combs included in systems.

† Fixed-height combs must be used with Mini-Sub Cell GT system gel trays. Adjustable-height combs require comb holder, #1704331.

Wide Mini-Sub Cell GT Cells

The redesigned wide Mini-Sub Cell GT cell offers updated features that make electrophoresis even easier for multiple samples and rapid screening applications. This popular system has a wide platform that can separate 30 samples per comb. The wide Mini-Sub Cell GT cell is the same width as the Sub-Cell GT cell, so the comb holders, combs, and 15 x 10 cm gel trays are interchangeable with the larger Sub-Cell GT units. All wide mini cells accommodate ReadyAgarose precast gels and include a buffer tank, safety lid with cables, and leveling bubble.

The wide mini ReadySub-Cell GT cell (#1704489) is identical to the wide Mini-Sub Cell GT cell, except it is dedicated to running ReadyAgarose precast gels. This cell does not include casting gates, tray, or combs. These components are available to upgrade the wide mini ReadySub-Cell GT cell for handcasting capability.



For More Information
 Web: bio-rad.com/subcell

Ordering Information

Catalog #	UV-Transparent Tray, cm		Combs		Wide Mini Casting Gates	Mini Gel Caster	PowerPac Basic Power Supply (#1645050)
	15 x 7*	15 x 10	15-Well	20-Well			
Wide Mini-Sub Cell GT Systems**							
1704405	•		•	•	•		
1704485	•		•	•	•	•	
1704468		•	•	•			
1704469		•	•	•		•	
1640301		•	•	•		•	•
1704489							

Catalog # Description

Wide Mini-Sub Cell GT Accessories

1704497	Wide Mini-Sub Cell GT Handcasting Kit , includes 15 x 7 cm tray, casting gates, 15- and 20-well 1.5 mm fixed-height combs, 20-well 1.5 mm fixed-height comb
1704422	Mini-Sub Cell GT Gel Caster , for Mini-Sub Cell GT and wide Mini-Sub Cell GT systems
1704426	Wide Mini-Sub Cell GT UV-Transparent Gel Tray , 15 x 7 cm (trays have 2 slots for fixed-height combs)
1704416****	Sub-Cell GT UV-Transparent Gel Tray , 15 x 10 cm (trays have 2 slots for fixed-height combs)
1704425	Wide Mini-Sub Cell GT Casting Gates
1704371	Wide Mini-Sub Cell GT Cell Replacement Lid with Cables
1704372	Wide Mini-Sub Cell GT Anode (Red) QuickSnap Electrode Assembly
1704373	Wide Mini-Sub Cell GT Cathode (Black) QuickSnap Electrode Assembly

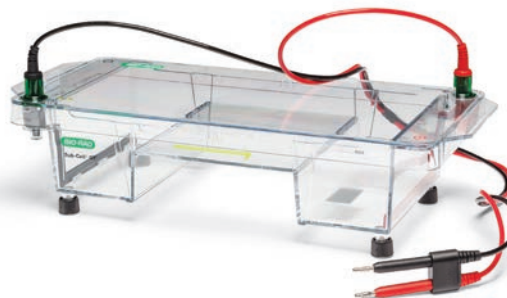
* Allows casting gels in the cell using casting gates; 15 x 10 cm gels can be cast with a gel caster.

** Tray is compatible with the Sub-Cell DNA system.

*** 15 x 10 cm gel tray can be used for both wide Mini-Sub Cell GT and Sub-Cell GT cells.

Sub-Cell GT Cell

The redesigned Sub-Cell GT cell is the most versatile horizontal electrophoresis cell in the Sub-Cell family, offering the greatest choice of gel lengths, combs, and separation modes that make it ideal for Southern and northern blotting protocols. Up to 30 samples can be resolved over a distance of 25 cm. Using four rows of combs, the cell can run up to 120 samples. All Sub-Cell GT units include a buffer tank, safety lid with cables, leveling bubble, and combs (15- and 20-well). System configurations that include additional accessories are also available.



For More Information
 Web: bio-rad.com/subcell

Ordering Information

Catalog #	UV-Transparent Tray, cm				Combs		Casting Gates	Gel Caster	PowerPac Basic Power Supply (#1645050)
	15 x 10	15 x 15*	15 x 20	15 x 25	15-Well	20-Well			
Sub Cell GT Systems**									
1704401	•				•	•			
1704481	•				•	•		•	
1704402		•			•	•	•		
1704482		•			•	•	•	•	
1640302		•			•	•	•	•	•
1704403			•		•	•			
1704483			•		•	•		•	
1704404				•	•	•			
1704484				•	•	•		•	

Catalog # Description

Sub-Cell GT Accessories

- 1704412 Sub-Cell GT Gel Caster, for Sub-Cell GT Systems
- 1704416** Sub-Cell GT UV-Transparent Gel Tray, 15 x 10 cm (trays have 2 slots for fixed-height combs)
- 1704417* Sub-Cell GT UV-Transparent Gel Tray, 15 x 15 cm
- 1704418 Sub-Cell GT UV-Transparent Gel Tray, 15 x 20 cm
- 1704419 Sub-Cell GT UV-Transparent Gel Tray, 15 x 25 cm
- 1704415 Sub-Cell GT Casting Gates
- 1704392 Sub-Cell GT Anode (Red) QuickSnap Electrode Assembly
- 1704393 Sub-Cell GT Cathode (Black) QuickSnap Electrode Assembly

* Allows casting gels in the cell using casting gates. Other gel sizes can be cast with a gel caster.

** 15 x 10 cm gel tray can be used for both Sub-Cell GT and wide Mini-Sub cell GT cells.

Combs for Wide Mini-Sub Cell and Sub-Cell GT Cells

Ordering Information

Catalog #	# of Wells	Height	Thickness, mm	Width of Well, mm	Length of Teeth, mm	Volume, μ l (in 5 mm deep gel)
Fixed and Adjustable Combs						
1704449	30	Fixed	1.5	3	15	20
1704344	30	Adjustable	1.5	2.7	19.1	20
1704447	20	Fixed	0.75	5	15	18.75
1704448**	20	Fixed	1.5	5	15	37.5
1704321	20	Adjustable	0.75	4.8	19.1	17
1704322	20	Adjustable	1.5	4.8	19.1	34
1704445	15	Fixed	0.75	6	15	22.5
1704446**	15	Fixed	1.5	6	15	45
1704323	15	Adjustable	0.75	5.5	19.1	21
1704324	15	Adjustable	1.5	5.5	19.1	42
1704443	10	Fixed	0.75	10	14.0	37.5
1704444	10	Fixed	1.5	10	14.0	75
1704325	10	Adjustable	0.75	9.9	19.1	37.0
1704326	10	Adjustable	1.5	9.9	19.1	74.0
Preparative Combs*						
1704442	4 preparative 2 reference	Fixed	1.5	27 3	14.0	200 22
1704441	2 preparative 2 reference	Fixed	1.5	50 4	14.0	375 30
1704440	1 preparative 2 reference	Fixed	1.5	106 4	14.0	795 30
1704328	1 preparative 2 reference	Adjustable	3.0	106 4	14.0	1,590 60
Multichannel Pipet-Compatible Combs *						
1704456	26	Fixed	0.75	3	15	11.25
1704457	26	Fixed	1.5	3	15	22.5
1704454	18	Fixed	0.75	3	14.0	11.25
1704455	18	Fixed	1.5	3	14.0	22.5
1704452	14	Fixed	0.75	6	20	22.5
1704453	14	Fixed	1.5	6	20	45.0
1704450	10	Fixed	0.75	6	14.0	22.5
1704451	10	Fixed	1.5	6	14.0	45.0

* Fixed-height combs must be used with GT gel trays. Adjustable-height combs require comb holder, #1704320.

** Combs included in systems.

ReadyAgarose Precast Gels

ReadyAgarose precast gels are prepared in gel trays designed to fit securely in Mini-Sub Cell GT and wide Mini-Sub Cell GT cells (page 262). They come in a choice of 17 gel types, including ReadyAgarose 96 Plus gels, which resolve DNA fragments from 20 to 10,000 bp. Gels are individually packaged and cast in their own running tray with Bio-Rad's Certified agarose. Gel types to choose from include:

- Mini, wide, and 96-sample formats
- 1% and 3% agarose
- TBE or TAE buffer
- With or without ethidium bromide
- Multichannel pipet-compatible wells
- Compatible with Mini-Sub Cell GT and wide Mini-Sub Cell GT cells

ReadyAgarose 96 Plus Products — Ideal for High-Throughput Applications

ReadyAgarose 96 Plus products include:

- ReadyAgarose 96 Plus precast gels
- Wide mini ReadySub-Cell GT cell

For More Information

Web: bio-rad.com/agarosegel

Download bulletin: 2647

See Also

Certified agaroses: page 274.

Nucleic acid reagents: page 272.

PowerPac Basic and PowerPac HC power supplies: page 187.

Premixed running buffers: page 273.

Ordering Information

Description	8-Well	12-Well	2 x 8-Well
Mini ReadyAgarose Gels, TBE			
1.0% plus ethidium bromide	1613004	1613010	—
Mini ReadyAgarose Gels, TAE			
1.0%	1613015	—	1613057
1.0% plus ethidium bromide	1613016		
3.0%	1613017	1613022	
	20-Well	32-Well	2 x 32-Well
Wide Mini ReadyAgarose Gels, TBE			
1.0% plus ethidium bromide	1613028	1613034	—
3.0% plus ethidium bromide	1613030	1613036	—
Wide Mini ReadyAgarose Gel, TAE			
1.0% plus ethidium bromide	1613044	1613050	1613054
	4 x 26-Well		
ReadyAgarose 96 Plus Gel, TBE			
3.0% plus ethidium bromide	1613062		
ReadyAgarose 96 Plus Gels, TAE			
1.0% plus ethidium bromide	1613063		
3.0% plus ethidium bromide	1613065		

Catalog # Description

ReadySub-Cell GT Cells for ReadyAgarose Gels

1704487	Mini ReadySub-Cell GT Cell , includes buffer tank, lid and electrodes, leveling bubble; accommodates 8-, 12-, and 2 x 8-well mini ReadyAgarose gels
1704489	Wide Mini ReadySub-Cell GT Cell , includes buffer tank, lid and electrodes, leveling bubble; accommodates 20-, 32-, 2 x 32-, and 4 x 26-well wide mini ReadyAgarose gels

Instruction Manual

1613000	ReadyAgarose Instruction Manual , free upon request with ReadyAgarose gel purchase
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Pulsed Field Gel Electrophoresis

Pulsed field gel electrophoresis (PFGE) resolves large DNA molecules by alternating the electrical field between spatially distinct pairs of electrodes, causing DNA molecules as large as several megabases to reorient and move at different speeds through the pores in an agarose gel. Bio-Rad offers a clamped homogenous electrical field (CHEF) system that incorporates different PFGE technologies for optimal resolution in various size ranges (see CHEF Mapper Specifications below).

 [Learn More about the Technology](#)
Web: bio-rad.com/tech/pfge

Agaroses, Reagents, and Standards for PFGE

Bio-Rad offers a comprehensive line of agaroses (page 274), standards and markers (pages 270–271), buffers (page 273), and other reagents to make PFGE simple and convenient. See page 270 for genomic DNA plug preparation kits.

For More Information
Web: bio-rad.com/PFGE

CHEF Mapper Specifications

Feature	CHEF Mapper XA
Fragment size	100 bp–10 Mb
Optimal separation size range	100 bp–10 Mb
Auto-algorithm and interactive algorithm	•
Program storage	20 complex programs
Programming blocks of run conditions	8 blocks
Battery-operated backup RAM	•
Pulse angle	0–360°
Asymmetrical angles	•
Nonlinear switch-time ramping (expands linear range of fragment separation to 50–700 kb)	•
Multistate separation	•
Secondary pulses (voltage interrupts)	•
FIGE and asymmetric FIGE (resolution of fragments in the 100 bp–250 kb range)	•
Resolution	All size ranges
Recommended use	Ideal for all PFGE applications Most accurate results Most reproducible results Fastest runs

CHEF Mapper XA System

The CHEF Mapper XA system is ideal for any PFGE application. Features include:

Automation

- Built-in auto-algorithm and interactive algorithm

Customization

- Store up to 99 simple programs or 20 complex programs with up to 8 blocks of programming each

Application Versatility

- Ability to choose any pulse angle from 0–360°
- Optimal resolution of both megabase- and kilobase-sized DNA fragments
- Resolution of very large DNA molecules with secondary pulses that release DNA caught in the gel matrix



- Rapid resolution of small fragments in the 100 bp–250 kb range with FIGE and AFIGE technologies
- Expanded linear range of fragment separation to 50–700 kb
- Enhanced resolution in selected fragment size ranges

For More Information

Web: bio-rad.com/chefXA

Download bulletin: 1906

Ordering Information

Catalog # Description

CHEF Mapper XA System*

1703670	CHEF Mapper XA System , 120 V, includes power module, embedded auto-algorithm for protocol optimization, interactive algorithm program disk, electrophoresis cell, cooling module, variable-speed pump, Tygon tubing (12'), 14 x 13 cm (W x L) casting stand, 15-well 1.5 mm comb and comb holder, screened cap, disposable plug molds, leveling bubble, cables, <i>S. cerevisiae</i> DNA size standards, two 0.5 A FB fuses, 5 g pulsed field Certified agarose, 5 g Certified megabase agarose, for North America
1703671	CHEF Mapper XA System , 100 V, for Japan
1703672	CHEF Mapper XA System , 220 V, for Asia Pacific/Europe
1703673	CHEF Mapper XA System , 240 V, for Asia Pacific/Europe

Accessories for CHEF Mapper System*

1703654	Cooling Module , 120 V, for North America
1703688	Cooling Module , 100 V, for Japan
1703655	Cooling Module , 220/240 V, for Asia Pacific/Europe
1703644	Variable-Speed Pump , 120 V
1703648	Electrodes , thick gauge (0.02"), 6
1703711	Screened Caps , 5
1703713	50-Well Disposable Plug Molds , enough for 250 plugs
1703622	Reusable Plug Mold , 10 plug
1703689	Standard Casting Stand , includes 14 x 13 cm frame and platform
1703704	Wide/Long Combination Casting Stand , includes 21 x 14 cm frame and platform
1703643	Gel Scoop
1703699	Combination Comb Holder

Combs for CHEF Mapper System

1704326	10-Well Adjustable-Height Comb , 1.5 mm
1704325	10-Well Adjustable-Height Comb , 0.75 mm
1704324	15-Well Adjustable-Height Comb , 1.5 mm
1704323	15-Well Adjustable-Height Comb , 0.75 mm
1704322	20-Well Adjustable-Height Comb , 1.5 mm
1704344	30-Well Adjustable-Height Comb , 1.5 mm
1703627	15-Well Comb , 21 cm wide, 1.5 mm thick
1703628	30-Well Comb , 21 cm wide, 1.5 mm thick
1703645	45-Well Comb , 21 cm wide, 1.5 mm thick
1704046	Leveling Table , 20 x 30 cm

*A comprehensive listing of replacement parts can be found at bio-rad.com.

CHEF Genomic DNA Plug Kits

CHEF genomic DNA plug kits provide a convenient means for preparing intact, chromosome-sized DNA for PFGE. Three kits are available for the preparation of bacterial (lysozyme-sensitive) or mammalian genomic DNA and yeast chromosomes (YACs). Each kit contains all the enzymes, reaction buffers, and restriction digest-qualified CleanCut agarose necessary to prepare 100 plugs as well as disposable plug molds and screened caps for simplified plug processing. Each kit is thoroughly tested to ensure that prepared genomic DNA can be restriction digested and separated on a CHEF electrophoresis system.



Ordering Information

Catalog # Description

CHEF Genomic DNA Plug Kits

1703591	CHEF Mammalian Genomic DNA Plug Kit , contains 12 ml cell suspension buffer, 1.3 ml proteinase K, 30 ml proteinase K reaction buffer, 12 ml 2% CleanCut agarose, 60 ml 10x wash buffer, screened cap, 2 disposable plug molds; makes 100 plugs
1703592	CHEF Bacterial Genomic DNA Plug Kit , contains 12 ml cell suspension buffer, 1.3 ml proteinase K, 30 ml proteinase K reaction buffer, 12 ml 2% CleanCut agarose, 60 ml 10x wash buffer, 1.6 ml lysozyme (25 mg/ml), 30 ml lysozyme buffer, screened cap, 2 disposable plug molds; makes 100 plugs
1703593	CHEF Yeast Genomic DNA Plug Kit , contains 12 ml cell suspension buffer, 1.3 ml proteinase K, 30 ml proteinase K reaction buffer, 12 ml 2% CleanCut agarose, 60 ml 10x wash buffer, 1.6 ml lyticase, 25 ml lyticase buffer, screened cap, 2 disposable plug molds; makes 100 plugs
1703594	CleanCut Agarose, 2%, 12 ml

See Also

Pulsed field gel electrophoresis systems: page 268.

Imaging systems: page 298.

Bioinformatics software: page 303.

Certified agaroses: page 274.

Agaroses and Standards for Pulsed Field Gel Electrophoresis

Bio-Rad offers a comprehensive line of agaroses for use with PFGE as well as CHEF DNA standards and convenient buffers and reagents to simplify your PFGE experiments. See page 274 for agaroses and page 271 for size standards and buffers.

Pulsed Field Standards

Bio-Rad offers standards for applications from FIGE separation of cosmid inserts to the largest chromosomal separations. The higher MW standards are prepared in low-melt agarose blocks that can be cut to fit most well dimensions.

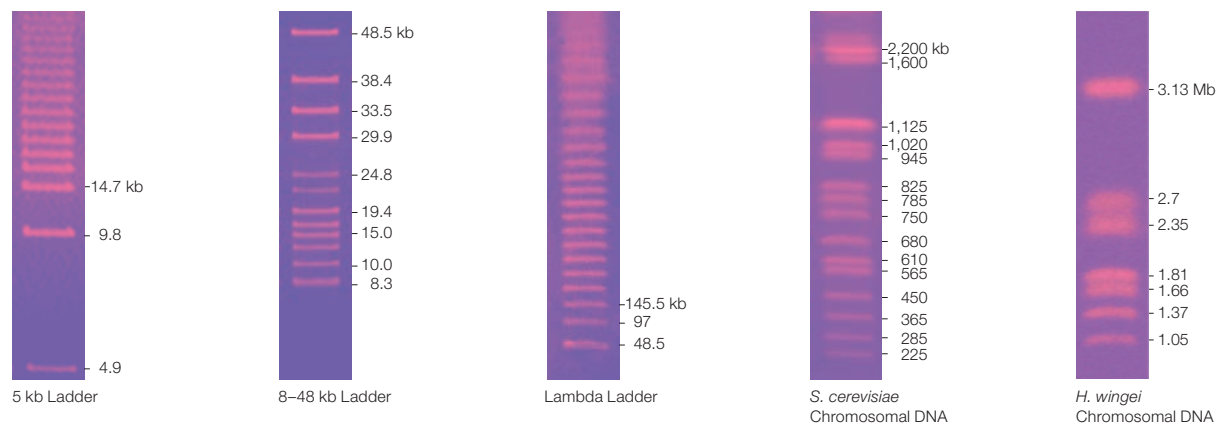
DNA Ladders Selection Guide

Type	Description
Pulsed Field Standards	
CHEF DNA standards	Derived from plasmids and lambda phage
CHEF DNA markers	Chromosomal DNA in low-melt agarose blocks

Pulsed Field Standards Selection Guide

	Range	Contents	Amount	Number of Applications
5 kb ladder	4.9–120 kb	Concatemers of pBR328	20 µg in 200 µl	20–25
8–48 kb ladder	8.3–48.5 kb	Mixed digest of phage	25 µg in 125 µl	125
Lambda ladder	0.05–1 Mb	Concatemers of phage cI857Sam7	5 agarose blocks	25–40
<i>S. cerevisiae</i>	0.225–2.2 Mb	<i>Saccharomyces cerevisiae</i> chromosomal DNA	5 agarose blocks	25–40
<i>H. wingei</i>	1–3.1 Mb	<i>Hansenula wingei</i> chromosomal DNA	5 agarose blocks	25–40

Pulsed Field Standards



Ordering Information

Catalog #	Description
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Agaroses and Standards for Pulsed Field Gel Electrophoresis

1613108	Certified Megabase Agarose, 25 g
1613109	Certified Megabase Agarose, 125 g
1613110	Certified Megabase Agarose, 500 g
1613100	Certified Molecular Biology Agarose, 25 g
1613101	Certified Molecular Biology Agarose, 125 g
1613102	Certified Molecular Biology Agarose, 500 g
1620137	Pulsed Field Certified Agarose, 100 g
1620138	Pulsed Field Certified Agarose, 500 g

Premixed Nucleic Acid Electrophoresis Buffers

1610733	10x Tris/Boric Acid/EDTA (TBE), 1 L
1610770	10x Tris/Boric Acid/EDTA (TBE), 5 L cube
1610743	50x Tris/Acetic Acid/EDTA (TAE), 1 L
1610773	50x Tris/Acetic Acid/EDTA (TAE), 5 L cube

Pulsed Field Standards*

1703624	CHEF DNA Size Standard, 5 kb ladder, 4.9–120 kb, 20–25 lanes
1703707	CHEF DNA Size Standard, 8–48 kb, 125 lanes
1703635	CHEF DNA Size Standard, lambda ladder, 0.05–1 Mb, 5 agarose blocks, sufficient for 25–40 plugs

Pulsed Field Markers*

1703605	CHEF DNA Size Marker, <i>S. cerevisiae</i> , 0.2–2.2 Mb, 5 agarose blocks, sufficient for 25–40 plugs
1703667	CHEF DNA Size Marker, <i>H. wingei</i> , 1–3.1 Mb, 5 agarose blocks, sufficient for 25–40 plugs

* CHEF, clamped homogeneous electrical field. For more information, see page 268–270.

Buffers and Reagents for Nucleic Acid Electrophoresis

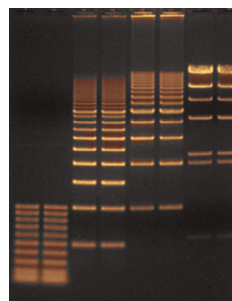
Ethidium Bromide Solution

Ethidium bromide is a sensitive fluorescent stain for visualizing DNA or RNA in agarose and polyacrylamide gels. Ethidium bromide is excited with a standard 302 nm UV transilluminator and emits a red-orange signal that can be photographed with Polaroid film or with a CCD-based gel documentation system.

Bio-Rad's premixed ethidium bromide solution eliminates preparation steps and minimizes exposure to hazardous ethidium bromide. Ethidium bromide solution is supplied as a 10 mg/ml solution in 10 ml bottles.

For More Information

Web: bio-rad.com/nastains



DNA stained with ethidium bromide.



Ordering Information

Catalog #	Description
1610433	Ethidium Bromide Solution, 10 mg/ml, 10 ml

Tracking Dyes

Bio-Rad offers two tracking dyes to monitor electrophoresis runs:

- Bromophenol blue for monitoring nucleic acid and protein electrophoresis
- Xylene cyanole FF for monitoring nucleic acid electrophoresis



Ordering Information

Catalog #	Description
1610404	Bromophenol Blue, 10 g
1610423	Xylene Cyanole FF, 25 g

Store at room temperature, dry, and away from direct sunlight.

UView 6x Loading Dye and Stain

Eliminate the need for gel staining with this easy-to-use UView 6x loading dye. Because it also acts as an in-gel stain, it saves precious time.

- Loading dye plus in-gel stain
- Saves time
- Nontoxic
- UV detection

For More Information
 Web: bio-rad.com/uview



See Also

UView transilluminator: page 436.

Ordering Information

Catalog #	Description
1665111	UView 6x Loading Dye and Stain , 0.2 ml
1665112	UView 6x Loading Dye and Stain , 1 ml

Premixed Running Buffers

Premixed running buffers can be used with handcast or precast gels. Simply dilute with distilled deionized water. Save time and standardize electrophoresis runs with these premixed running buffers.



Premixed Running Buffer Selection Guide

Buffer	1x Formulation	Applications
Nucleic Acid Electrophoresis		
10x TBE	89 mM Tris, 89 mM boric acid, 2 mM EDTA, pH 8.3	Nucleic acid electrophoresis/sequencing; polyacrylamide or agarose gels
10x TBE extended range	130 mM Tris, 45 mM boric acid, 2.5 mM EDTA, pH 8.3	Nucleic acid electrophoresis/sequencing; polyacrylamide or agarose gels; extends the buffer capacity for longer DNA sequencing runs
50x TAE	40 mM Tris, 20 mM acetic acid, 1 mM EDTA, pH 8.0	Nucleic acid electrophoresis; polyacrylamide or agarose gels

Ordering Information

Catalog #	Description
Premixed Nucleic Acid Electrophoresis Buffers	
1610773	50x Tris/Acetic Acid/EDTA (TAE) , 5 L cube
1610770	10x Tris/Boric Acid/EDTA (TBE) , 5 L cube
1610743	50x Tris/Acetic Acid/EDTA (TAE) , 1 L bottle
1610733	10x Tris/Acetic Acid/EDTA (TBE) , 1 L bottle

See Also

DNA electrophoresis systems: page 261.
 Overlay agaroses: page 233.
 CleanCut agarose: page 270.
 CHEF genomic DNA plug kits: page 270.
 Premixed running buffers: page 273.

Certified Agaroses

All Certified agarose products are 100% pure and GQT grade, guaranteeing the absence of inhibitors, DNases, and RNases and minimizing background staining. Use the guide below to choose the agarose for your application.



Certified Agarose Selection Guide

Application	Molecular Biology Agarose	PCR Agarose	Low Range Ultra Agarose	Low-Melt Agarose	PCR Low-Melt Agarose	Megabase Agarose	Pulsed Field Agarose
Analytical Separation							
≥1,000 bp	•			•			
≤1,000 bp		•			•		
10–200 bp			•				
1 kb–2 Mb						•	•
1 kb–5 Mb						•	

Certified molecular biology agarose — this general-purpose agarose ensures that DNA recovered from a preparative gel can be manipulated without compromising quality. It has a very low sulfate content that yields a very high gel strength and higher exclusion limit. The high electrophoretic mobility increases resolution and reduces run time, and the gels are easy to handle even at low agarose percentages.

Certified PCR agarose — Certified PCR agarose is recommended for separation of DNA fragments ≤1,000 bp. This high-strength agarose forms gels that are easy to handle even at high gel percentages, minimizing the risk of cracking or breaking. PCR agarose gels at 40°C so it is faster and easier to prepare than GQT products with similar sieving properties that gel at higher temperatures.

Certified low range ultra agarose — this agarose provides superior resolution of small PCR fragments and primers. A 3% gel clearly resolves a 10 bp ladder and a 4% gel approaches the resolution of an 8% polyacrylamide gel.

Certified low-melt agarose — this low melting temperature agarose has a high resolving capacity for DNA fragments ≥1,000 bp. It is recommended for preparative electrophoresis

and for in-gel applications such as digestion and ligation. It is also recommended for embedding chromosomes and megabase-sized DNA for pulsed field applications.

Certified PCR low-melt agarose — this agarose yields excellent resolution of fragments ≤1,000 bp in an analytical or preparative format. It is ideal for digestion by agarose and for all in-gel applications.

Certified megabase agarose — this Certified agarose is the superior choice for CHEF and FIGE applications. The gels are easy to handle even at concentrations as low as 0.3%. The separation range is between 1 kb and 5 Mb. Low background staining also provides superior imaging of high MW DNA.

Pulsed field Certified agarose — this agarose enables excellent separation and resolution of large DNA fragments in pulsed field gel applications. The optimal separation range is 1 kb–2 Mb. Running conditions for this agarose are a preset selectable method of the CHEF Mapper XA system auto-algorithm.

For More Information
 Web: bio-rad.com/agarose
 Download bulletin: 2755

Ordering Information

Description	25 g	125 g	500 g
Certified Agaroses for Standard Applications			
Certified molecular biology agarose	1613100	1613101	1613102
Certified PCR agarose	1613103	—	1613105
Certified low range ultra agarose	1613106	1613107	—
Certified megabase agarose	1613108	1613109	1613110
Certified low-melt agarose	1613111	1613112	—
Certified PCR low-melt agarose	1613113	1613114	1613115
Catalog #	Description		
1620137	Pulsed Field Certified Agarose, 100 g		
1620138	Pulsed Field Certified Agarose, 500 g		

DNA Ladders

Bio-Rad offers a broad variety of DNA ladders for conventional DNA gel electrophoresis, including molecular rulers with evenly spaced banding patterns and EZ Load rulers premixed with loading buffer.

DNA Ladder Selection Guide

Type	Description
Molecular Rulers	
Standard and EZ Load molecular rulers	DNA ladders of even base pair length increments, available in 5 size ranges
AmpliSize molecular ruler	Blunt-end DNA of precise length and known sequence

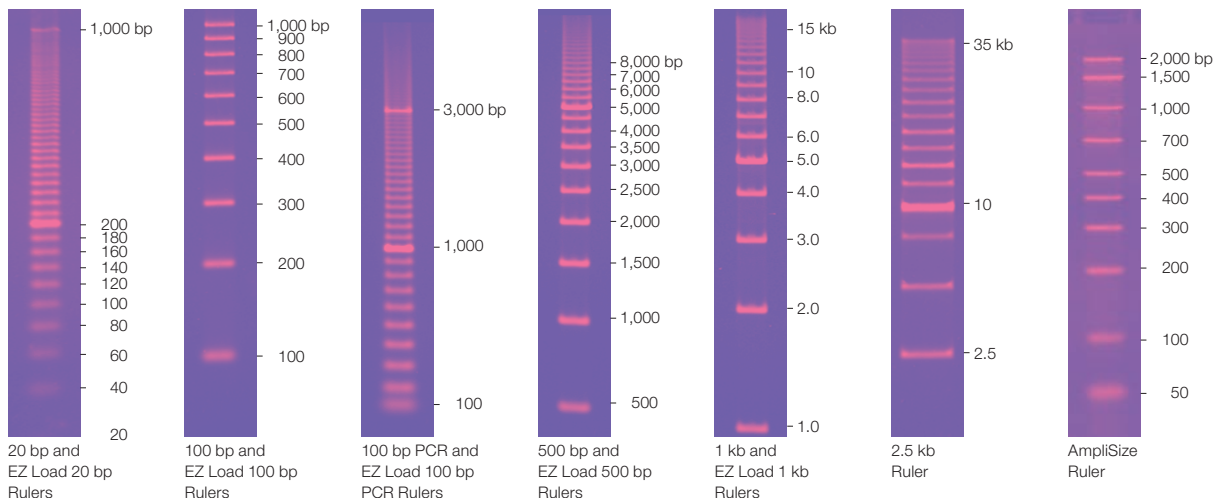
Molecular Rulers Selection Guide

Ruler	Concentration	Range	Number of Bands	Reference Band	Amount, µg DNA	Suggested Agarose Type	Number of Applications
20 bp EZ Load 20 bp	0.2 µg/µl 0.1 µg/µl	20–1,000 bp	50 in 20 bp increments	200 bp	50	2.5–4%	100
100 bp EZ Load 100 bp	0.1 µg/µl 0.05 µg/µl	100–1,000 bp	10 in 100 bp increments	None	25	2.5–4%	100
100 bp PCR EZ Load 100 bp PCR	0.2 µg/µl 0.08 µg/µl	100–3,000 bp	30 in 100 bp increments	1,000 bp and 3,000 bp	40	0.8–3%	100
500 bp EZ Load 500 bp	0.2 µg/µl 0.08 µg/µl	500–8,000 bp	16 in 500 bp increments	5,000 bp	40	0.8–1%	100
1 kb EZ Load 1 kb	0.2 µg/µl 0.08 µg/µl	1–15 kb	15 in 1 kb increments	5 kb	40	0.8–1%	100
2.5 kb	0.1 µg/µl	2.5–35 kb	14 in 2.5 kb increments	10 kb	40	0.8%	100
AmpliSize	0.1 µg/µl (10 ng/band/µl)	50–2,000 bp	10 of proprietary blunt ended DNA	None	25	1.5–3%	50

See Also

Pipet tips: page 427.
 Micro test tubes: page 431.
 ReadyAgarose precast gels: page 267.
 Imaging systems: page 298.
 DNA electrophoresis systems: page 261.

Molecular Rulers



Molecular Rulers

Molecular rulers are DNA ladders with precisely defined size intervals between bands for simplified estimation of the length of single- and double-stranded DNA separated on agarose gels. Bio-Rad provides three types of molecular rulers for simplified estimation of length.

- **Standard molecular rulers** — DNA ladders of even base pair length increments; ready for dilution
- **EZ Load molecular rulers** — similar to standard molecular rulers but prediluted to a concentration appropriate for most electrophoresis runs
- **AmpliSize molecular rulers** — blunt-end DNA of precise length and known sequence

Ordering Information

Catalog #	Description
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20 bp Molecular Rulers

1708201	20 bp Molecular Ruler , 250 μ l, 20–1,000 bp, 100 applications
1708351	EZ Load 20 bp Molecular Ruler , 500 μ l, 20–1,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications

100 bp Molecular Rulers

1708202	100 bp Molecular Ruler , 250 μ l, 100–1,000 bp, 100 applications
1708352	EZ Load 100 bp Molecular Ruler , 500 μ l, 100–1,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications
1708206	100 bp PCR Molecular Ruler , 200 μ l, 100–3,000 bp, 100 applications
1708353	EZ Load 100 bp PCR Molecular Ruler , 500 μ l, 100–3,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications

500 bp Molecular Rulers

1708203	500 bp Molecular Ruler , 200 μ l, 500–8,000 bp, 100 applications
1708354	EZ Load 500 bp Molecular Ruler , 500 μ l, 500–8,000 bp, includes 1 ml 5x nucleic acid sample buffer, 100 applications

1 kb Molecular Rulers

1708204	1 kb Molecular Ruler , 200 μ l, 1–15 kb, 100 applications
1708355	EZ Load 1 kb Molecular Ruler , 500 μ l, 1–15 kb, includes 1 ml 5x nucleic acid sample buffer, 100 applications

2.5 kb Molecular Ruler

1708205	2.5 kb Molecular Ruler , 400 μ l, 2.5–35 kb, 100 applications
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AmpliSize Molecular Ruler

1708200	AmpliSize Molecular Ruler , 250 μ l, 50–2,000 bp, 50 applications
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Experion Automated Electrophoresis System

The Experion automated electrophoresis system automatically performs all the steps of gel-based electrophoresis, providing a comprehensive platform for the analysis of nucleic acids and proteins.

 [Learn More about the Technology](#)
Web: bio-rad.com/tech/experion

Rapid Analysis of Proteins, RNA, and DNA

The Experion system performs automated sample separation, staining, destaining, imaging, band detection, quantitation, and data analysis in as little as 30 minutes. Results are digitally stored for easy record keeping and reporting. The software interface and functionality are intuitive, and the system's microfluidic technology provides good reproducibility and accuracy for routine analysis.

Reproducible Separation, Sizing, and Quantitation

- Single-step protein sizing from 10–260 kD
- Protein sensitivity down to 2.5 ng/μl
- RNA concentration and integrity (RQI) determination at nanogram and picogram levels
- Single-step sizing and quantitation analysis of DNA fragments
- Simple chip priming — automated method for reproducible, error-free results

Convenient Data Analysis Tools

- Automatic sizing and quantitation calculations
- Intuitive navigation of separation and data analysis screens
- Quick comparisons of samples across the chip or from chip to chip
- Digital data storage for easy record keeping and reporting
- Flexible and easy export options and annotation ability for publications, reports, and presentations



A Powerful Complement to Many Applications

The Experion system is the ideal complement to a number of applications, including sizing and quantitation of DNA fragments for PCR and restriction digest experiments, RNA integrity assessments prior to real-time PCR, microarray, and next-generation sequencing experiments (for example, using Illumina® or Roche sequencers). RNA integrity assessment via RQI has been recommended as part of the MIQE guidelines. Leading scientists have developed these guidelines to increase the quality and reproducibility of quantitative PCR and real-time PCR data. The Experion system also provides quick protein purity analysis and results in digitized formats, which complement protein applications such as laboratory-scale chromatography, crystallography, and process-scale purification.

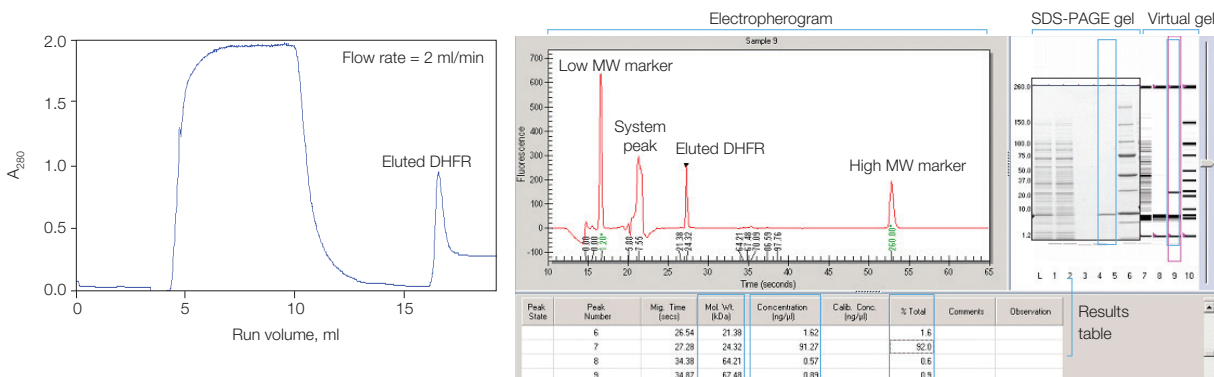
For More Information

Web: bio-rad.com/experion
Download bulletins: 3140, 3169, 3170, 3171, and 5520

Note: The Experion automated electrophoresis system was discontinued in 2016. Analysis kits and support for this system will continue to be available through 2021.

See Also

Real-time PCR systems: page 375.
Chromatography systems: page 148.



Analysis of chromatographic fractions with the Experion system. **Left,** chromatogram showing purification of histidine-tagged DHFR using Profinity IMAC resin and the BioLogic DuoFlow system. **Right,** comparison of analysis of fractions using the Experion system and SDS-PAGE (shown as inset). The Experion system generated an electropherogram and virtual gel image of the separation. Note that the virtual gel image is comparable to the SDS-PAGE gel image. The Experion system also automatically reports the size (MW), relative concentration, and percent of each resolved protein in the total sample in the results table.

Experion Priming Station

The Experion automated priming station consistently prepares chips for successful automated electrophoresis with minimal hands-on time. It is used with all Experion chips regardless of whether the application is for protein, RNA, or DNA samples. Preset time and pressure settings ensure optimal priming of the gel matrix into the microchannels of the chip in preparation for sample analysis. This device helps ensure higher quality and more reproducible results than those obtainable with less reliable manual priming methods.

Automated Chip Priming

- Large LCD display clearly shows the preset time and pressure settings
- Integrated timer conveniently counts down the time-sensitive priming step
- Coordinating alignment arrows on the chip and priming station ensure proper chip placement
- Built-in pressure-activated release mechanism ensures precise priming
- Secure locking mechanism prevents early release while priming



Experion priming station.

The priming station primes the chip by applying pressure and pushing the gel-stain solution into the microchannels of the chip. This automated priming method helps ensure reproducible chip performance.

Note: The Experion automated electrophoresis system was discontinued in 2016. Analysis kits and support for this system will continue to be available through 2021. The Experion priming station was discontinued in 2017. The Experion priming seals and support for the Experion priming station will continue to be available through 2022.

Ordering Information

Catalog #	Description
7007031	Experion Priming Seals, replacement, provides air seal on top of priming well, 2

Experion Vortex Station II

The Experion vortex station II ensures complete mixing of RNA or DNA samples and analysis reagents. The specially designed vortex adaptor prongs securely hold the chip during the 1 minute vortex cycle. Preset speed and time settings provide single-step, precise mixing of samples and reagents.

Note: The Experion automated electrophoresis system was discontinued in 2016. Analysis kits and support for this system will continue to be available through 2021. The Experion vortex station II was discontinued in 2017. Support for the Experion vortex station II will continue to be available through 2022.



Experion vortex station II. The vortex station is needed for nucleic acid analysis.

Experion Software

Experion software adds to the efficiency of the Experion automated electrophoresis system. Results are displayed with peak electropherograms, in a virtual gel view, and as results tables. Additionally, versions 3.0 and above automatically generate a validated RNA quality indicator (RQI) number that correlates with eukaryotic total RNA sample integrity. The RQI complements the electropherogram and reported ribosomal peak area ratio visual assessments.

Key Features

- Real-time display of data acquisition
- Manual integration of peaks
- Automatic sizing, quantitation, and % total calculations
- Statistical evaluations (mean, std deviation, and %CV)
- Multiple protein quantitation method options
- Flexible printing and data export options

Experion Validation Kit (Optional)

The IQ/OQ validation kit includes automated protocols that test the critical functions of the system to verify and validate the system to the specified functionality. Validation should be performed at least biannually, when troubleshooting, and after moving the instrument.

Experion Security Edition Software (Optional)

The optional Security Edition offers tools for compliance with U.S. FDA 21 CFR Part 11 regulations:

- Different levels of access to different software functions
- Audit trail table tracks daily use of the system
- Password protection and auto lock function maintain database and file integrity
- Electronic signatures facilitate record keeping and tracking
- Report generation enables quick viewing and archiving of multiple run parameters, data, audit trail, and electronic signatures

For More Information

Web: bio-rad.com/experionsoftware

Download bulletins: [3171](#) and [5761](#)

Note: The Experion automated electrophoresis system was discontinued in 2016. Analysis kits and support for this system will continue to be available through 2021. The Experion priming station and Experion vortex station II were discontinued in 2017. Support for these stations will continue through 2022.

System Requirements

Operating system	Windows XP (Service Pack 3), Windows Vista (Service Pack 1), Windows 7 (32 bit)
Processor (CPU)	Pentium 4 (3 GHz processor) PC only
RAM	1 GB
Hard drive space	80 GB
USB 2.0	1 port
Other drives	CD-ROM

See Also

Chromatography systems: page 148.

Real-time PCR systems: page 375.

Sample preparation products: page 2.

Experion Analysis Kits

Experion analysis kits combine innovative chip design with high-quality reagents to perform reproducible, quantitative, and accurate protein, RNA, or DNA analyses in minutes. Streamlined chip preparation methods and low sample and reagent volume requirements result in rapid experiments with minimal hands-on time.

For More Information

Web: bio-rad.com/experionanalysiskits

Download bulletins: 3140, 3169, 3170, 3171, 5520, and 5761

Note: The Experion automated electrophoresis system was discontinued in 2016. Analysis kits and support for this system will continue to be available through 2021.



Experion Pro260 Analysis Kit

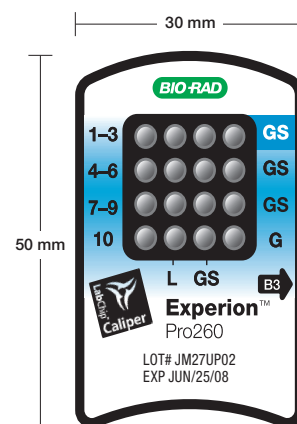
The Experion Pro260 analysis kit makes protein separation, sizing, and quantitation fast and easy. The Pro260 kit offers the ability to analyze ten protein samples (10–260 kD) in approximately 30 minutes. Accurate sizing is achieved with the Experion Pro260 ladder, part of the Precision Plus Protein family of standards. Refer to the specifications table for more details.

Experion RNA HighSens and RNA StdSens Analysis Kits

For accurate assessment of RNA quality prior to downstream experiments, Experion RNA analysis kits offer rapid single-step quality assessments and the ability to analyze 11 or 12 samples in approximately 30 minutes. Sample concentrations in nanogram or picogram amounts can be analyzed, depending on the kit. Refer to the specifications table for more details. For a fast and objective assessment of total RNA integrity, an RNA quality indicator (RQI) value is automatically generated for eukaryotic samples.

Experion DNA 1K and DNA 12K Analysis Kits






The Experion DNA 1K and DNA 12K analysis kits allow analysis of DNA samples with size ranges of 15–1,500 bp and 50–17,000 bp, respectively. These DNA assays provide high sensitivity and excellent resolution (down to 5 bp) over a broad dynamic range. Consuming only 1 μ l of



Experion Pro260 Chip

sample for each analysis, the Experion automated system can analyze 11 samples in approximately 30–40 minutes. These assays are recommended for analysis of restriction digests, amplified DNA, microsatellites, and AFLPs.

Specifications

	 Pro260 Chip	 RNA HighSens Chip	 RNA StdSens Chip	 DNA 1K Assay	 DNA 12K Assay
Number of samples	1–10	1–11	1–12	1–11	1–11
Sample volume	4 μ l	1 μ l	1 μ l	1 μ l	1 μ l
Linear dynamic range	5–2,000 ng/ μ l BSA	—	—	—	—
Concentration range	5–2,000 ng/ μ l	100–5,000 pg/ μ l	5–500 ng/ μ l	0.1–50 ng/ μ l	0.1–50 ng/ μ l
Separation range	10–260 kD	—	—	15–1,500 bp	50–17,000 bp
Sensitivity	2.5 ng/ μ l of carbonic anhydrase in 1x PBS	100 pg	5 ng	0.1 ng	0.1 ng

Experion Automated Electrophoresis System

bio-rad.com/experion

Ordering Information

Catalog #	Description
7007101	Experion Pro260 Analysis Kit for 10 Chips , includes 10 Pro260 chips, 1 cleaning chip, 3 x 520 µl Pro260 gel, 45 µl Pro260 stain, 60 µl Pro260 ladder (10–260 kD), 400 µl Pro260 sample buffer, 3 spin filters
7007102	Experion Pro260 Analysis Kit for 25 Chips , includes 25 Pro260 chips, 1 cleaning chip, 5 x 520 µl Pro260 gel, 2 x 45 µl Pro260 stain, 2 x 60 µl Pro260 ladder (10–260 kD), 2 x 400 µl Pro260 sample buffer, 5 spin filters
7007103	Experion RNA StdSens Analysis Kit for 10 Chips , includes 10 RNA StdSens chips, 2 cleaning chips, 1,250 µl RNA gel, 20 µl RNA StdSens stain, 20 µl RNA ladder, 900 µl RNA StdSens loading buffer, 2 spin filters
7007104	Experion RNA StdSens Analysis Kit for 25 Chips , includes 25 RNA StdSens chips, 2 cleaning chips, 2 x 1,250 µl RNA gel, 2 x 20 µl RNA StdSens stain, 2 x 20 µl RNA ladder, 2 x 900 µl RNA StdSens loading buffer, 4 spin filters
7007105	Experion RNA HighSens Analysis Kit for 10 Chips , includes 10 RNA HighSens chips, 2 cleaning chips, 1,250 µl RNA gel, 20 µl RNA HighSens stain, 20 µl RNA ladder, 900 µl RNA HighSens loading buffer, 100 µl RNA sensitivity enhancer, 2 spin filters
7007106	Experion RNA HighSens Analysis Kit for 25 Chips , includes 25 RNA HighSens chips, 2 cleaning chips, 2 x 1,250 µl RNA gel, 2 x 20 µl RNA HighSens stain, 20 µl RNA ladder, 2 x 900 µl RNA HighSens loading buffer, 2 x 100 µl RNA sensitivity enhancer, 4 spin filters
7007107	Experion DNA 1K Analysis Kit for 10 Chips , includes 10 DNA chips, 1 cleaning chip, 3 x 250 µl DNA 1K gel, 40 µl DNA 1K stain, 20 µl DNA 1K ladder, 750 µl DNA 1K loading buffer, 3 spin filters
7007108	Experion DNA 12K Analysis Kit for 10 Chips , includes 10 DNA chips, 1 cleaning chip, 650 µl DNA 12K gel, 40 µl DNA 12K stain, 20 µl DNA 12K ladder, 750 µl DNA 12K loading buffer, 3 spin filters
7007307	Experion DNA 1K Analysis Kit for 30 Chips , includes 30 DNA chips, 3 cleaning chips, 9 x 250 µl DNA 1K gel, 3 x 40 µl DNA 1K stain, 3 x 20 µl DNA 1K ladder, 3 x 750 µl DNA 1K loading buffer, 9 spin filters
7007308	Experion DNA 12K Analysis Kit for 30 Chips , includes 30 DNA chips, 3 cleaning chips, 3 x 650 µl DNA 12K gel, 3 x 40 µl DNA 12K stain, 3 x 20 µl DNA 12K ladder, 3 x 750 µl DNA 12K loading buffer, 9 spin filters

Experion Analysis Kit Accessories

7007151	Experion Pro260 Chips , 10, plus 1 cleaning chip
7007152	Experion Pro260 Reagents and Supplies for 10 Chips , includes 3 x 520 µl Pro260 gel, 45 µl Pro260 stain, 60 µl Pro260 ladder (10–260 kD), 400 µl Pro260 sample buffer, 3 spin filters
7007153	Experion RNA StdSens Chips , 10, plus 2 cleaning chips
7007154	Experion RNA StdSens Reagents and Supplies for 10 Chips , includes 1,250 µl RNA gel, 20 µl RNA StdSens stain, 20 µl RNA ladder, 900 µl RNA StdSens loading buffer, 2 spin filters
7007155	Experion RNA HighSens Chips , 10, plus 2 cleaning chips
7007156	Experion RNA HighSens Reagents and Supplies for 10 Chips , includes 1,250 µl RNA gel, 20 µl RNA HighSens stain, 20 µl RNA ladder, 900 µl RNA HighSens loading buffer, 100 µl RNA sensitivity enhancer, 2 spin filters
7007163	Experion DNA Chips , 10, for DNA 1K and 12K analyses, plus 1 cleaning chip
7007164	Experion DNA 1K Reagents and Supplies for 10 Chips , includes 3 x 250 µl DNA 1K gel, 40 µl DNA 1K stain, 20 µl DNA 1K ladder, 750 µl DNA 1K loading buffer, 3 spin filters
7007165	Experion DNA 12K Reagents and Supplies for 10 Chips , includes 650 µl DNA 12K gel, 40 µl DNA 12K stain, 20 µl DNA 12K ladder, 750 µl DNA 12K loading buffer, 3 spin filters
7007251	Experion Cleaning Chips , 10
7007252	Experion Electrode Cleaner , 250 ml
7007253	Experion DEPC-Treated Water , 100 ml
7007254	Experion Spin Filters , 10
7007255	Experion RNA Ladder , 20 µl
7007256	Experion Pro260 Ladder , 60 µl
7007261	Experion DNA 1K Ladder , 20 µl
7007262	Experion DNA 12K Ladder , 20 µl
7007112	Experion Mouse Liver Total RNA Standard , 500 ng/µl, 20 µl
5000208	Bovine Gamma Globulin (BGG) Standard , 2 mg/ml, 2 ml
7007264	Cleaning Swabs , lint free, for electrode deep cleaning, 25
7007270	Experion Pro260 Sample Buffer , 400 µl, 2 vials
1632091	ReadyPrep Proteomics Grade Water , 500 ml
1610710	2-Mercaptoethanol , 25 ml
1610610	Dithiothreitol (DTT) , 1 g

Note: The Experion automated electrophoresis system was discontinued in 2016. Analysis kits and support for this system will continue to be available through 2021.

Experion Starter Kits

Experion starter kits include all the necessary consumables to illustrate the utility of the Experion system in protein or RNA applications.

The Experion protein starter kit (using the Pro260 chip) provides information on:

- How best to prepare and load a protein chip
- Protein quantitation and sizing using a known standard
- Creating and running a calibration curve
- The concept of scaling for the virtual gel
- Tips and common mistakes

The Experion RNA starter kit (using RNA StdSens chip) provides information on:

- How best to prepare and load an RNA chip
- How to confirm RNA quality and integrity
- The concept of scaling for the virtual gel
- Tips and common mistakes

Each kit contains:

- Experion reagents
- Three Experion chips
- Cleaning chips
- RNase-free tips
- RNase-free tubes
- DEPC-treated water
- DTT (protein kit only)
- Spin filters
- Electrode cleaner
- Cleaning swabs (lint free)
- Control sample
- Detailed instruction manual
- CD-ROM with system introduction and chip loading video



For More Information

Web: bio-rad.com/experionstarterkits

Download bulletin: 5732

Note: The Experion automated electrophoresis system was discontinued in 2016. Analysis kits and support for this system will continue to be available through 2021.

Ordering Information

Catalog #	Description
7007110	Experion Pro260 Starter Kit , includes 3 Experion chips, 1 cleaning chip, Experion reagents, spin filters, IgG protein standard, DTT, cleaning swabs (lint free), electrode cleaner, narrow bore polypropylene pipet tips, polypropylene 0.5 ml microcentrifuge tubes, DEPC-treated water (0.2 µm filtered)
7007111	Experion RNA StdSens Starter Kit , includes 3 Experion chips, 2 cleaning chips, Experion reagents, spin filters, total RNA standard, cleaning swabs (lint free), electrode cleaner, narrow bore polypropylene pipet tips, RNase- and DNase-free polypropylene 0.5 ml microcentrifuge tubes, DEPC-treated water (0.2 µm filtered)

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Antibodies



Antibodies

See Also

SureBeads magnetic beads system: page 2.

Bio-Rad offers an extensive selection of antibodies on our dedicated antibody website, bio-rad-antibodies.com. Antibodies can now also be added to your cart on bio-rad.com.

More than 10,000 antibodies, reagents, standards, controls, and kits are available for research use. Specificity and performance are hallmarks of the antibody collections. Antibodies can be used for many applications, including:

- Western blotting
- Flow cytometry
- Immunohistochemistry
- Enzyme-linked immunosorbent assay
- Immunofluorescence

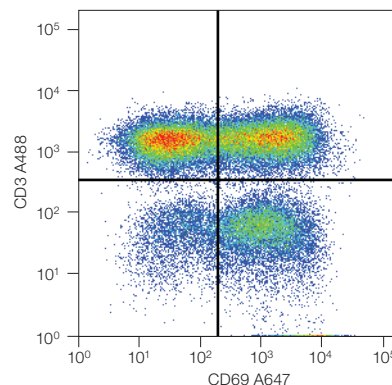
Antibodies are available for the following research areas:

- Cancer
- Cell biology
- Immunology
- Neuroscience
- Regulated cell death
- Stem cell research
- Veterinary immunology

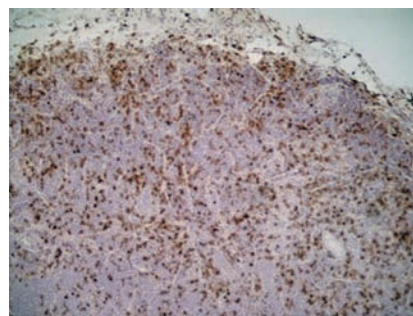
Antibodies conjugated to over 20 dyes, including Bio-Rad's StarBright fluorophores, Alexa Fluor, DyLight, fluorescein isothiocyanate (FITC), and phycoerythrin (PE), for multicolor flow cytometry are also available.

In addition, Bio-Rad offers the PrecisionAb antibody product line, which is extensively validated for western blotting (see page 287).

Antibodies are highly specific and come with a performance guarantee. The following data show two of the many antibody clones that are unique to Bio-Rad.



Flow cytometry analysis of activated human T cells. Human peripheral blood lymphocytes were stimulated with phytohemagglutinin and lipopolysaccharide for 48 hours prior to being dual stained with mouse anti-human CD3A488 (#MCA463A488) and CD69A647 (#MCA2806A647) in the presence of human seroblock (#BUF070A). Forward and side scatter gating was applied. Activated T cells can be identified as positive for both CD3 and CD69.



Immunoperoxidase staining of anti-rat CD68, a macrophage marker. A rat lymph node cryosection was probed with mouse anti-rat CD68 antibody, clone ED1, followed by horseradish peroxidase-conjugated goat anti-mouse IgG₁ antibody.

HuCAL Recombinant Antibody Technology

Bio-Rad uses HuCAL technology to offer a custom service for the in vitro generation of fully human monoclonal antibodies. With this technique, specific Fab antibodies can be generated within 8 weeks, with a greater than 90% success rate and without the immunization of animals. The HuCAL PLATINUM library contains more than 45 billion functional human antibody specificities already prefabricated in an engineered Fab format. The technology uses CysDisplay, a novel and proprietary phage display method that allows for the selection of high-affinity antibodies that are expressed on the surface of a filamentous phage. Antibodies can be customized to specific needs.

For More Information

Web: bio-rad-antibodies.com

PrecisionAb Primary Antibodies Validated for Western Blotting



Primary Antibodies for Reproducible Western Blots

PrecisionAb antibodies are rigorously validated for western blotting. Each antibody is screened using Bio-Rad's V3 Western Workflow. PrecisionAb antibodies are a premium line selected to deliver industry-leading quality and performance.

Methods for Antibody Validation

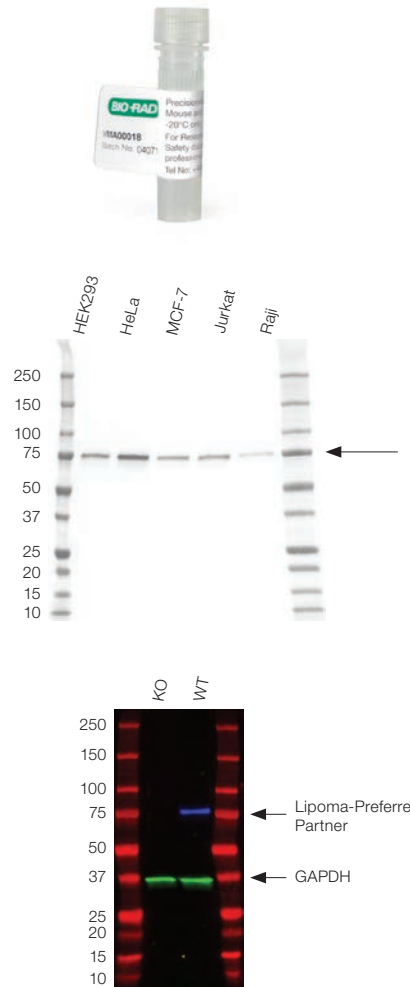
These include genetic strategies such as measuring the relevant signal in control cell lines, where the target gene has been knocked out by CRISPR-Cas9.

Product features include:

- **High specificity** — each antibody is extensively validated to ensure that it exhibits low nonspecific binding
- **High sensitivity** — all antibodies must be able to detect the protein of interest at endogenous levels
- **Reproducible performance** — stringent QC procedures ensure consistent lot-to-lot performance
- **Expanding selection of antibodies** — in cancer, neuroscience, and immunology
- **Testing** against cells and tissues expressing the endogenous target

For More Information

Web: bio-rad.com/precisionab



To assess antibody performance, we analyze multiple cell lines and tissues known to express the target, as well as negative controls. The results are published as images on our website and on the antibody datasheets.

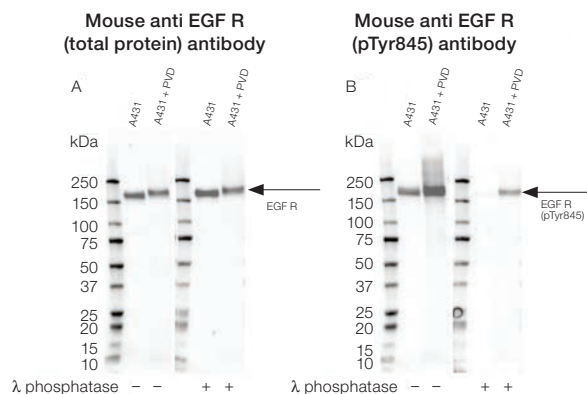
Phospho-Specific PrecisionAb Antibodies

Bio-Rad's new phospho-specific PrecisionAb antibodies have been validated by comparing phosphorylation levels in both treated versus untreated cell lysates, and by dephosphorylating proteins on western blot membranes, as seen here. The phosphorylation level quantification enables you to quickly determine the impact of cellular treatments and provides you with an easy way to assess the antibody specificity.

To showcase the different binding characteristics of phospho-specific and total protein antibodies, we have compared phospho-specific PrecisionAb antibodies against total PrecisionAb antibodies; this enables you to assess the impact of the different treatments and provides a control recommendation. The total and phospho-specific antibody can be purchased individually.

For More Information

Web: bio-rad.com/phospho-precisionab



Ordering Information

Catalog #	Description
VMA00746	Mouse Anti-EGF Receptor (pSer1047)
VMA00749	Mouse Anti-EGF Receptor (pTyr1068)
VMA00750	Mouse Anti-EGF Receptor (pTyr1086)
VMA00751	Mouse Anti-EGF Receptor (pTyr1148)
VMA00752	Mouse Anti-EGF Receptor (pTyr1173)
VMA00748	Mouse Anti-EGF Receptor (pTyr845)
VMA00753	Mouse Anti-ErbB2 (pTyr1112)
VMA00754	Mouse Anti-GSK3 Alpha (pSer21)
VMA00755	Mouse Anti-STAT3 (pSer727)
AHP2590	Rabbit Anti-EGF Receptor (pTyr1068)
AHP2592	Rabbit Anti-EGF Receptor (pTyr1086)
AHP2601	Rabbit Anti-ErbB2 (pTyr1221/pTyr1222)
AHP2602	Rabbit Anti-ErbB2 (pTyr1248)
AHP2604	Rabbit Anti-ErbB3 (pTyr1328)
AHP2605	Rabbit Anti-ErbB4 (pTyr1284)
AHP2650	Rabbit Anti-MEK 1 (pThr291)
AHP905	Rabbit Anti-p38 MAPK (pThr180/pTyr182)
AHP2666	Rabbit Anti-p53 (pSer6)
AHP2685	Rabbit Anti-STAT3 (pSer727)

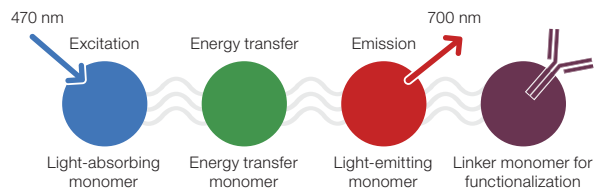
StarBright Fluorescent Secondary Antibodies

The StarBright fluorophore is composed of a condensed polymer made up of multiple light-absorbing and -emitting monomers, which provides an exceptionally bright signal compared to most traditional fluorophores.

StarBright Blue 700 (excitation/emission = 470/700 nm) and StarBright Blue 520 (excitation/emission = 488/520) are Bio-Rad's ultrasensitive fluorescent labels that allow detection of low-abundance proteins within seconds of exposure time with minimal background. Highly cross-adsorbed goat anti-rabbit and goat anti-mouse secondary antibodies conjugated to StarBright are ideal for fluorescent western blotting, either for the detection of a single target protein or for multiplex detection of several proteins on one blot without stripping and reprobing. These antibodies are optimized for use with the ChemiDoc MP imaging system, permitting detection of multiple proteins in a single blot, thus saving time, sample, and reagents.

- **Easy multiplexing** — StarBright secondary antibodies can be used with IRDye 800CW or other traditional red, green, and blue (RGB) fluorophores to detect multiple proteins on the same blot. They can also be used with Bio-Rad's stain-free technology and/or hFAB rhodamine housekeeping protein fluorescent primary antibodies for protein normalization
- **Short exposure time** — exceptional brightness of the StarBright fluorophore leads to shorter exposure times compared to traditional fluorescent dyes: seconds vs. minutes

- **High signal-to-noise ratio** — StarBright Blue 700 secondary antibodies emit in the far red part of the spectrum where there is minimal background (excitation maximum/emission maximum = 470/700 nm)
- **Greater sensitivity** — StarBright Blue 520 is 2- to 4-fold more sensitive than other green-emitting fluorophores, such as Alexa Fluor 488 or DyLight 488
- **Low nonspecific binding** — StarBright fluorophore is conjugated to highly cross-adsorbed antibodies



Schematic representation of a StarBright Blue 700 label conjugated to an antibody. The light-absorbing monomer is excited at 470 nm and, via an efficient intramolecular transfer process, the energy is transmitted to a light-emitting monomer that emits at 700 nm. The linker monomer is used for antibody conjugation.

For More Information

Web: bio-rad.com/starbrightblue
Request or download bulletin: 6911

Ordering Information

Catalog #	Description
12004159	StarBright Blue 700 Goat Anti-Mouse IgG, 80 μ l
12004158	StarBright Blue 700 Goat Anti-Mouse IgG, 400 μ l
12004157	StarBright Blue 700 Goat Anti-Mouse IgG, 5 x 400 μ l
12004162	StarBright Blue 700 Goat Anti-Rabbit IgG, 80 μ l
12004161	StarBright Blue 700 Goat Anti-Rabbit IgG, 400 μ l
12004160	StarBright Blue 700 Goat Anti-Rabbit IgG, 5 x 400 μ l
12005867	StarBright Blue 520 Goat Anti-Mouse IgG, 80 μ l
12005866	StarBright Blue 520 Goat Anti-Mouse IgG, 400 μ l
12005870	StarBright Blue 520 Goat Anti-Rabbit IgG, 80 μ l
12005869	StarBright Blue 520 Goat Anti-Rabbit IgG, 400 μ l

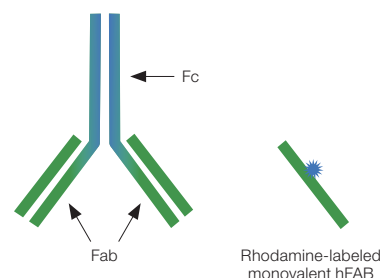
hFAB Rhodamine Housekeeping Protein Fluorescent Primary Antibodies

hFAB rhodamine fluorescent primary antibodies are monovalent human Fabs, which allow one-step detection of common housekeeping proteins actin, tubulin, and GAPDH in human, mouse, or other common mammalian samples. These anti-actin, anti-tubulin, and anti-GAPDH antibodies are directly labeled with a rhodamine derivative (excitation maximum/emission maximum = 530/580 nm). The hFAB rhodamine antibodies were generated with Human Combinatorial Antibody Library (HuCAL) technology, making these recombinant antibodies ideal for use in multiplex western blotting without worrying about species cross-reactivity.

These housekeeping antibodies can be used for protein normalization when the loading amounts are in the linear dynamic range. They can be used in multiplex experiments with StarBright Blue 700 fluorescent secondary antibodies as well as other traditional fluorescent antibodies, permitting detection of multiple target proteins and the housekeeping protein in a single blot.

- **Simple** — no requirement for a secondary antibody; 1-step detection of housekeeping proteins using highly cross-adsorbed antibodies for high specificity and sensitivity
- **Versatile** — compatible with a wide range of other fluorophores, including StarBright Blue 700 and DyLight 800 fluorophores, for multiplex western blotting

- **Unique** — HuCAL technology eliminates cross-reactivity with primary or secondary antibodies from other species
- **Ideal for multiplexing** — allows simultaneous detection of proteins of interest and housekeeping proteins on the same blot without stripping, reprobing, or cutting the membrane



Schematic representation comparing the structure of the IgG molecule with the rhodamine-labeled monovalent hFAB housekeeping antibody.

For More Information

Web: bio-rad.com/hkp

Request or download bulletin: 6911

Ordering Information

Catalog #	Description
12004164	hFAB Rhodamine Anti-Actin Primary Antibody , 40 µl, pkg of 1, lyophilized rhodamine-conjugated anti-actin human Fab fragment; reconstitute to 40 µl
12004163	hFAB Rhodamine Anti-Actin Primary Antibody , 200 µl, pkg of 1, lyophilized rhodamine-conjugated anti-actin human Fab fragment; reconstitute to 200 µl
12004166	hFAB Rhodamine Anti-Tubulin Primary Antibody , 40 µl, pkg of 1, lyophilized rhodamine-conjugated anti-tubulin human Fab fragment; reconstitute to 40 µl
12004165	hFAB Rhodamine Anti-Tubulin Primary Antibody , 200 µl, pkg of 1, lyophilized rhodamine-conjugated anti-tubulin human Fab fragment; reconstitute to 200 µl
12004168	hFAB Rhodamine Anti-GAPDH Primary Antibody , 40 µl, pkg of 1, lyophilized rhodamine-conjugated anti-GAPDH human Fab fragment; reconstitute to 40 µl
12004167	hFAB Rhodamine Anti-GAPDH Primary Antibody , 200 µl, pkg of 1, lyophilized rhodamine-conjugated anti-GAPDH human Fab fragment; reconstitute to 200 µl

Secondary Antibodies



The following products are available on bio-rad-antibodies.com.

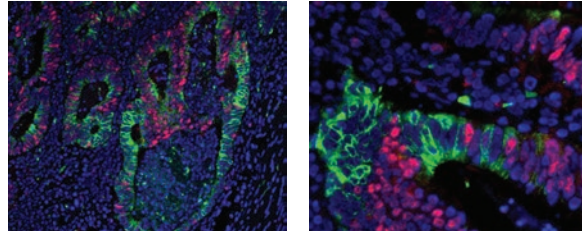
Secondary antibodies are commonly used to detect and visualize the presence of a primary antibody in applications including western blotting or immunofluorescent histology. In these applications, the secondary antibody is labeled with a reporter molecule, which may be an enzyme such as HRP or a fluorophore such as FITC. Multiple secondary antibodies can bind to a single primary antibody, increasing the sensitivity and amplifying the signal.

Bio-Rad's secondary reagents have been carefully selected to provide optimum quality and flexibility for your experimental design. They are suitable for a wide range of applications including flow cytometry, western blotting, and immunocytochemistry. Options include:

- Monoclonal or polyclonal
- IgG molecules or F(ab')₂ fragments
- Multiple formats (see product options below)
- Cross-adsorbed and isotype-specific antibodies
- Fluorescent StarBright secondary antibodies (exceptionally bright and ideal for multiplex western blotting)

Secondary antibody product options.

Target	Host	Class and Chain	Conjugates
Human	Donkey	Ig	Purified
Mouse	Rabbit	IgA, IgA A1, IgA A2, IgA H, IgA secretory chain	Serum
Rat	Goat	IgD, IgD H, IgD D	S/N
Goat	Mouse	IgE	FITC
Rabbit	Sheep	IgG, IgG1, IgG2, IgG2a, IgG2b, IgG2c, IgG3	Tritc
Sheep	Rat	IgG4, IgG H/L, IgG Fc, IgG Fc CH2 domain, IgG	HRP
Bovine	Human	CH2 domain, IgG CH3 domain, IgG gamma, IgG	Biotin
Guinea pig		Fab, IgG F(ab') ₂	Alkaline phosphatase
Cat		IgM, IgM Mu, IgM H	Texas Red
Chicken		IgG/A/M	StarBright Blue
Monkey		Lamba light chain	DyLight 405
Fish		Kappa light chain	DyLight 488
Dog		J chain	DyLight 550
Hamster			DyLight 650
Horse			DyLight 680
Pig			DyLight 800 Bgal



Fluorescent staining of human colon using secondary antibodies. FFPE human colon adenocarcinoma stained with mouse anti-cytokeratin 18 (#MCA1864), human anti-mouse IgG1 (#HCA309D488) (green), mouse anti-PCNA (#MCA1558), and human anti-mouse IgG2a (#HCA310D550) (red).

For More Information

Web: bio-rad.com/secondaries

New Isotype Specific Secondary Antibodies

Recombinant monoclonal antibodies directed against the three main mouse isotypes, IgG1, IgG2a, and IgG2b, are an alternative to cross-adsorbed secondary antibodies. They are capable of detecting individual isotypes without any species or isotype cross-reactivity, enabling multiple unlabeled mouse monoclonal antibodies to be used simultaneously. Multiplexing is therefore straightforward and an alternative species does not need to be sourced.

Benefits of isotype-specific secondary antibodies:

- High specificity with reduced background
- No isotype cross-reactivity
- Higher signal level
- Ideal for multiplexing
- Easy to use
- Fewer extra steps, saving time

For More Information

Web: bio-rad.com/isotype-secondaries

**Ordering Information**

Catalog #	Description
HCA309	Isotype Specific Secondary Antibodies , human anti-mouse IgG1
HCA310	Isotype Specific Secondary Antibodies , human anti-mouse IgG2a
HCA311	Isotype Specific Secondary Antibodies , human anti-mouse IgG2b

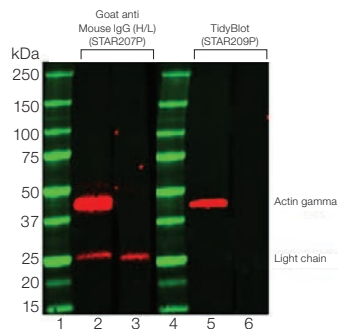
TidyBlot Western Blot Detection Reagent:HRP

TidyBlot reagent (STAR209P, STAR209PA, and STAR209PT) specifically binds to native antibodies. In contrast to conventional secondary antibodies, TidyBlot reagent enables the detection of immunoblotted target protein bands without interference from denatured IgG. Sources of denatured IgG include endogenous IgGs present in cell/tissue lysate and primary antibodies

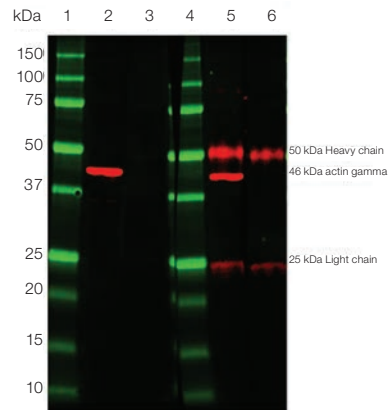
released from beads during immunoprecipitation experiments. The latter are particularly obstructive when detecting (co-) immunoprecipitated proteins, as IgG heavy (~50 kDa) and light (~25 kDa) chains may mask the protein(s) of interest.

For More Information

Web: bio-rad.com/tidyblot



Comparison of actin gamma detection in mouse thymus lysate using goat anti-mouse IgG (H/L) or TidyBlot reagent as secondary detection reagents. Precision Plus Protein prestained standards were run in lanes 1 and 4. Mouse anti-actin gamma PrecisionAb antibody (#VMA00049) was used in lanes 2 and 5. Lanes 3 and 6 are secondary-only controls. HRP conjugated goat anti-mouse IgG (H/L) secondary antibody (#STAR207P) was used in lanes 2 and 3. TidyBlot western blot detection reagent:HRP (#STAR209P) was used as the secondary reagent in lanes 5 and 6. Please note that TidyBlot reagent is HRP conjugated and that the western blot bands (red) and protein standards (green) have been pseudocolored.



Comparison of HRP conjugated TidyBlot western blot detection reagent (lanes 2 and 3) to a standard anti-mouse IgG (H/L) secondary antibody (lanes 5 and 6). In contrast to the anti-mouse secondary antibody, TidyBlot reagent binds only to the mouse anti-human actin gamma PrecisionAb antibody (#VMA00049) used for detection (lane 2). Lanes 3 and 6 are no-primary antibody controls. Please note that TidyBlot reagent is HRP conjugated and that the western blot bands (red) and protein standards (green) have been pseudocolored.

Ordering Information

Catalog #	Description
STAR209PT	TidyBlot Western Blot Detection Reagent:HRP, 50 µl
STAR209P	TidyBlot Western Blot Detection Reagent:HRP, 0.5 ml
STAR209PA	TidyBlot Western Blot Detection Reagent:HRP, 1 ml

Coming Soon StarBright Fluorophores for Flow Cytometry

These unique, proprietary polymer fluorophores are conjugated to Bio-Rad's highly validated antibodies and have been specially developed for flow cytometry to give you exceptional brightness. The brightness allows easy resolution of rare populations and low-density antigens. In addition, these fluorophores have the flexibility to fit into any multicolor panel.

For More Information

Web: bio-rad.com/starbright-flow



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Imaging Instruments, Analysis, and Software

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Imaging Systems

Imaging systems detect images and quantitate fluorescent, chemiluminescent, and colorimetric signals. Bio-Rad offers software (page 303) that provides automation for image acquisition with data analysis and validation. Refer to the guide below to select the imaging system best suited for your applications.

 [Learn More about the Technology](#)
 Web: bio-rad.com/tech/proteinimaging

Imaging System Selection Guide



Application	ChemiDoc MP	ChemiDoc	ChemiDoc XRS+	GelDoc Go	GS-900
Blot Detection					
Multiplex fluorescence	✓	—	—	—	—
Chemiluminescence	✓	✓	✓	—	—
Stain-free blots	✓	✓	✓	✓	—
Colorimetric	✓	✓	✓	✓	—
SYPRO Ruby protein blot stain*	✓	✓	✓	✓	—
Nucleic Acid Detection					
Ethidium bromide stain	✓	✓	✓	✓	—
SYBR® Green and SYBR® Safe stains	✓	✓	✓	✓	—
Fast Blast DNA stain	✓	✓	✓	✓	✓
Protein Detection, 1-D Gels					
Stain-free gels	✓	✓	✓	✓	—
Coomassie Blue stain	✓	✓	✓	✓	✓
Silver stain	✓	✓	✓	✓	✓
SYPRO Ruby protein gel stain and Oriole fluorescent gel stains	✓	✓	✓	✓	—
Protein Detection, 2-D Gels					
Coomassie Blue stain	✓	✓	✓	✓	✓
Silver stain	✓	✓	✓	✓	✓
SYPRO Ruby protein gel stain and Flamingo and Oriole fluorescent gel stains	✓	✓	✓	✓	—
Cy2, Cy3, Cy5 label	✓	—	—	—	—

✓ Recommended; — not recommended.
 * Optimal with low fluorescence PVDF membrane.

ChemiDoc MP and ChemiDoc Imaging Systems

The ChemiDoc MP and ChemiDoc imaging systems are Bio-Rad's premium digital imaging systems.

The ChemiDoc MP imaging system provides the best in chemiluminescent and fluorescent blot detection. It is designed to outperform any digital system on the market for multiplex fluorescent (red, green, and blue [RGB] and near infrared/infrared) western blotting, chemiluminescence detection, and general gel documentation applications. Simply pick the best detection method for your application. The ChemiDoc imaging system is built to allow ultrasensitive detection of chemiluminescent signal with the option to upgrade to ChemiDoc MP to enable fluorescence detection.

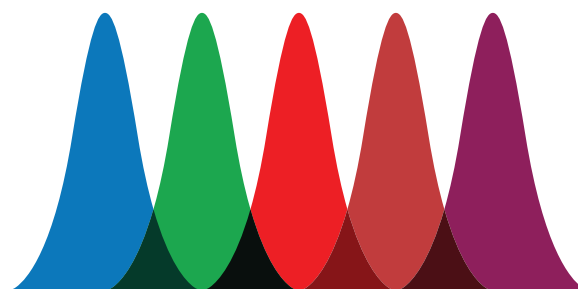
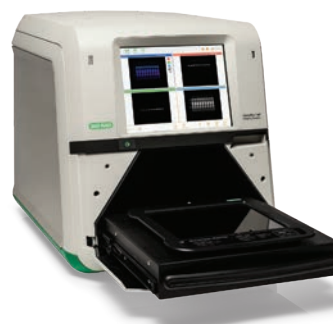
Both systems include Bio-Rad's Image Lab Touch software. Turn on the instrument and tap, explore, and learn in minutes, skipping lengthy instruction manuals. The software now includes advanced user accounts and administrative features for better data security and integrity.

With the ChemiDoc MP and ChemiDoc imaging systems you can:

- Get more reliable, trustworthy, and publishable data using stain-free technology to normalize your results with more than just a single protein
- Obtain the next level of fluorescence sensitivity with StarBright Blue 700 fluorescent secondary antibodies, which are more sensitive than traditional far red and near infrared dyes

For More Information

Web: bio-rad.com/chemidoc
Request or download bulletin: 6873



Blue	Green	Red	Far Red	Near Infrared
			StarBright Blue 700	
DyLight 488	DyLight 550	DyLight 650	DyLight 680	DyLight 800
Alexa Fluor 488	Alexa Fluor 546	Alexa Fluor 647	Alexa Fluor 680	Alexa Fluor 790
Cy2	Cy3	Cy5	Cy5.5	Cy7
	Rhodamine	SYPRO Ruby	IRDye 680	IRDye 800CW

Flexible dye selection with the ChemiDoc MP imaging system.

See Also

Stain-free gels (mini, midi formats): pages 198, 205.
V3 Western Workflow: page 238.
Trans-Blot Turbo transfer system: page 241.

Ordering Information

Catalog #	Description
12003154	ChemiDoc MP Imaging System , ultrasensitive chemiluminescence and fluorescence western blot imaging system
12003153	ChemiDoc Imaging System , ultrasensitive chemiluminescence western blot imaging system with optional upgrade for fluorescence detection
12005137	ChemiDoc MP and ChemiDoc IQ/OQ Kit , installation and operational qualification kit, includes protocols and imaging target
12003026	White Sample Tray , for white light applications
12003027	Blue Sample Tray , for low-intensity ultraviolet and SYBR applications
12003028	Blot/UV/Stain-Free Sample Tray , primary blot and gel detection tray, replacement for tray included with system
1708377	Holder for Sample Trays and UV Shield , pkg of 1, holds 3 sample trays and 1 UV shield; trays and shield not included
12003914	UV Safety Shield , to protect against UV light exposure during band excision
1708089	Mitsubishi Thermal Printer , optional thermal printer, for use with Bio-Rad imaging systems
1707581	Mitsubishi Thermal Printer Paper , pkg of 4, printer paper rolls for use with Mitsubishi thermal printer

See Also

- Protein gel stains:
page 225.
- Nucleic acid gel stain:
page 272.
- Gel analysis software:
page 303.
- ReadyAgarose precast
gel system: page 267.
- Western blotting:
page 238.

ChemiDoc XRS+ System

The ChemiDoc XRS+ system is based on CCD high-resolution, high-sensitivity detection technology and provides application flexibility. Key benefits include:

- Accurate, protocol-driven gel and blot imaging and analysis
- Automated quantitative analysis of protein and DNA samples in seconds
- Wide range of applications with special accessories to preserve sample integrity for downstream research while ensuring user safety
- Publication-quality results

ChemiDoc XRS+ System

The ChemiDoc XRS+ system offers sensitive chemiluminescence detection in addition to gel and blot documentation of fluorescent and colorimetric samples. The system includes a sensitive 16-bit CCD camera that is cooled for detection of faint samples. The XRS+ system is now compatible with stain-free technology, which offers checkpoints in western blot experiments and a convenient total protein loading control for data normalization.



For More Information

Web: bio-rad.com/imagingsystems
Request or download bulletin: 5837

Ordering Information

Catalog #	Description
1708265	ChemiDoc XRS+ System with Image Lab Software , compatible with PC or Mac, includes darkroom hood, UV transilluminator, epi-white illumination standard filter, camera, power supply, cables, Image Lab software
Accessories	
1708256	ChemiDoc XRS+ IQ/OQ , for use with Image Lab software
1708299	ChemiDoc XRS+ Installation Kit
1708289	White Light Conversion Screen , for use with non-touch screen ChemiDoc MP, ChemiDoc XRS+, and Gel Doc XR+ systems
1708081	Filter , standard emission, 62 mm
1708097	Standard 302 nm UV Lamps , 6 replacement bulbs
1708089	Mitsubishi Thermal Printer
1707581	Mitsubishi Thermal Printer Paper , 4 rolls, for use with Mitsubishi thermal printer
1708182	XcitaBlue Conversion Screen Kit , includes viewing goggles and standard detection filter
1708008	Orange Fluorescence Reference Plate
1703759	Bio-Rad Fluorescent Ruler
1703760	Gel Cutter Ruler
1708184	Gel Alignment Templates , pkg of 3, templates for aligning gels and blots, for use with ChemiDoc XRS+ and Gel Doc XR+ systems
1708026	Image Lab Focus Calibration Target

New GelDoc Go Imaging System

The GelDoc Go imaging system is a small, easy-to-use gel documentation system. Built with a large UV transilluminator, the GelDoc Go system offers the flexibility to image and excise bands from many different sizes and types of gels including traditional nucleic acid dyes (ethidium bromide) or SYBR® Safe dyes.

In just three clicks via Image Lab Touch software, you can simplify your gel documentation process but still remain in control of your research. Enjoy quick onboard software and a free, robust analysis package. Benefits include:

- **Simplicity** — use it right out of the box; no training or installation required
- **Small footprint, large imaging area** — do everything you need with minimal bench space
- **Flexibility** — image gels and colorimetric blots of varying sizes and stains
- **Band excision** — cut gels with a UV safety shield or use a blue tray to preserve DNA samples
- **Stain-free technology** — convert a 2 hr Coomassie staining protocol into a 1 min visualization step; no staining or destaining required
- **Easy user interface** — Image Lab Touch software enables simple and fast acquisition, user accounts, data export options, and more
- **License-free analysis software** — Image Lab software is a robust, well established analysis package available without a license for PC and Mac. Security Edition (CFR) is available as an upgrade (see pg 303)



For More Information
 Web: bio-rad.com/geldocgo
 Request or download bulletin: 7284

See Also

Stain-free gels (mini, midi formats): pages 198, 205.
 Protein Electrophoresis: page 182
 Nucleic Acid Electrophoresis: page 261

Ordering Information

Catalog #	Description
12009077	GelDoc Go Imaging System , small, easy-to-use gel documentation system, built to accommodate large gels and band excision
12012147	IQ/OQ Kit , installation and operational qualification kit, includes protocols and imaging target
12012189	UV Sample Tray , primary tray for nucleic acid gels, stain-free gels and colorimetric blots
12012165	White Sample Tray , for white light applications
12012160	Blue Sample Tray , an alternative to UV illumination to preserve DNA samples (SYBR applications)
12012164	UV Shield , to protect against UV light exposure during band excision
12012190	GelDoc Go Gel Alignment Template Kit

See Also

Mini-format vertical electrophoresis: page 194.
 Midi-format vertical electrophoresis: page 203.
 Protein standards: page 189.
 QC colloidal Coomassie stain: page 225.
 Image Lab software: page 303.

GS-900 Calibrated Densitometer

The GS-900 calibrated densitometer delivers superior accuracy, sensitivity, and data reproducibility. To ensure the accuracy of each scan, the GS-900 calibrated densitometer contains an internal optical density tablet, which is scanned and used for calibration before each run. Features include:

- Transmissive and reflective imaging using red, green, and blue CCD technology to optimally scan and quantitate colorimetric blots and gels treated with a variety of stains
- Accurate quantitation of samples over a large dynamic range (up to 3.4 OD) ensuring detection of both highly abundant and dilute proteins
- Scanning of larger gels for enhanced separation of proteins on oversized 29 x 33 cm imaging area
- IQ/OQ kit available for validation of the calibration functions using a NIST-traceable external target to confirm the accuracy of the internal target, guaranteeing accurate and reproducible results
- High resolution and analysis of closest bands on a gel due to 16-bit precision and 36.3 µm resolution
- Sealed imaging area to accommodate wet samples of variable thickness
- Purity analysis and lane background tools for manufacturing QC
- U.S. FDA 21 CFR Part 11 regulation compliance software available



For More Information

Web: bio-rad.com/gs900

Request or download bulletin: 6385

Ordering Information

Catalog #	Description
1707991	GS-900 Calibrated Densitometry System , PC-compatible calibrated densitometer, cables, Image Lab software, Biologics Analysis Workflow Starter Kit (Criterion cell, Criterion TGX precast gels, Precision Plus Protein standards, QC colloidal Coomassie stain, buffers)
1707993	GS-900 Regulatory Tools Package , includes GS-900 IQ/OQ Kit and Image Lab Security Edition 21 CFR Part 11 module, 1 license
1707994	GS-900 IQ/OQ Kit , set of protocols for installation qualification/operational qualification and NIST-traceable external step tablet for the GS-900 calibrated densitometer

Blot and Gel Image Analysis Software

Image Lab Software

Image Lab is a family of software packages that provides simple application-driven image acquisition, streamlined imaging analysis, and features to support better traceability and data security (U.S. FDA 21 CFR Part 11 compliance).

Image Lab Touch is the onboard software package for image acquisition on the ChemiDoc MP, ChemiDoc, and GelDoc Go imaging systems.

Image Lab desktop is the well-established and free Bio-Rad imaging software package with automated image acquisition by application for the ChemiDoc XRS+,

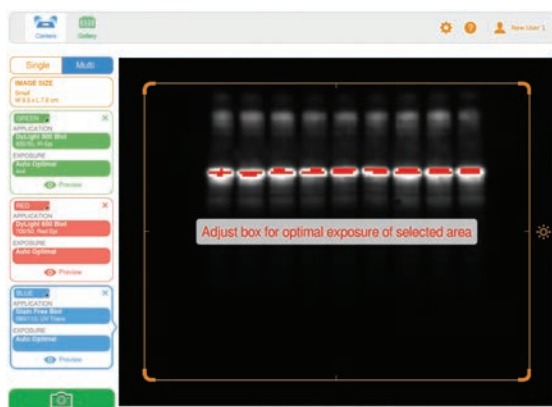
GS-900 densitometer, and legacy systems. In addition to easy acquisition it provides algorithm-driven analysis of gel and blot data using signals. Image Lab desktop is compatible with PC and Mac operating systems.

Image Lab software, Security Edition has the same features as Image Lab desktop but also provides traceability and data integrity in line with U.S. FDA 21 CFR Part 11 regulations. An additional fee is required for the Security Edition.

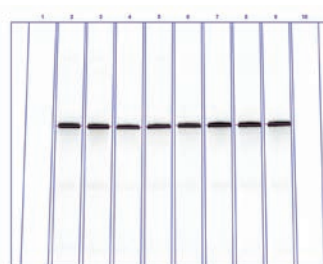
For More Information
 Web: bio-rad.com/imagelabsoftware

See Also

Imaging systems: page 298.
 Bio-Plex Manager software: page 310.
 Microplate Manager software: page 337.



Multichannel image acquisition with Image Lab Touch software.



Chemiluminescence and stain-free blot analysis on Image Lab desktop software.

Image Lab Software Selection Guide

System	Image Acquisition		Image Analysis	FDA 21 CFR Part 11 Compliance
	Image Lab Touch	Image Lab Desktop	Image Lab Desktop	Image Lab Security Edition
ChemiDoc MP	✓	—	✓	✓
ChemiDoc	✓	—	✓	✓
ChemiDoc XRS+	—	✓	✓	✓
GelDoc Go	✓	—	✓	✓
GS-900	—	✓	✓	✓

Ordering Information

Catalog #	Description
12012162	Image Lab Software, Security Edition for 21 CFR Part 11 compliance, 1 license
12012161	Image Lab Software, Security Edition for 21 CFR Part 11 compliance, 5 licenses
12012150	Image Lab Software, Security Edition for 21 CFR Part 11 compliance, 10 licenses

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GelDoc Go Imaging System, 301

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Bio-Plex Multiplex System

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Bio-Plex Multiplex System

The Bio-Plex multiplex platform is built on the most flexible technology available. Bio-Rad offers instruments to satisfy a variety of research needs and budgets for multiplex applications. These readers include the versatile Bio-Plex 200 system and the high-throughput capacity Bio-Plex 3D suspension array system.

 [Learn More about the Technology](#)
 Web: bio-rad.com/tech/bio-plex

Instruments, Software, and Tools

Bio-Plex System Selection Guide

	Bio-Plex 200	Bio-Plex 3D
		
Features	Versatile — accommodates multiple users Flexible — can read both magnetic and nonmagnetic assays One acquisition and analysis software package User-friendly data management	Meets high-throughput needs Optimal for labs with fewer budget restrictions Offers robotics interfacing
Read time (1 x 96-well plate)	~45 min	~20 min
Plate compatibilities	96-well	96- and 384-well
Number of measurable analytes/well	100	500
Assay compatibility	All magnetic and nonmagnetic (polystyrene) bead-based assays	Most magnetic and all nonmagnetic (polystyrene) bead-based assays
Acquisition software	Bio-Plex Manager	xPONENT
Analysis software	Bio-Plex Manager and Bio-Plex Data Pro	Bio-Plex Manager and Bio-Plex Data Pro
On-site training	Included	Included
Footprint (W x D x H)	16.9 x 20.1 x 9.1" (43 x 51 x 23 cm)	23 x 25.7 x 18" (58.4 x 65.3 x 45.7 cm)

Bio-Plex 200 System

The Bio-Plex 200 system integrates xMAP suspension array technology with a reliable instrument, dedicated software, and validation tools. The system includes:

- **Array reader** — distinguish up to 100 different color-coded bead sets, each representing a different assay. Results in up to 9,600 data points in 45 min from a familiar 96-well format
- **Optional high-throughput fluidics (HTF)** — delivers up to 20 L of sheath fluid (40 plates) without user intervention
- **Bio-Plex MCV plate IV** — customized for hands-free startup, shutdown, and performance testing
- **Bio-Plex Manager software** — controls the instrument, data acquisition, and analysis (Standard and Security Editions)

Time-saving features include:

- Simplified startup, shutdown, control, and pre- and post-run maintenance routines
- Sophisticated analysis and instrument control software
- Automated IQ/OQ



- Integrated system validation and calibration logs for a record of system performance
- Superior curve fitting, statistics reporting, and charting features
- Calibration capabilities for both broad and low range standard dilutions

For More Information

Web: bio-rad.com/bio-plex200

Download bulletin: 6006

Ordering Information

Catalog #	Description
171000201	Bio-Plex 200 System , 100–240 V, includes array reader, microplate platform, Bio-Plex Manager software with workstation license, PC, monitor, calibration kit, validation kit 4.0, MCV plate IV, Bio-Plex reservoir, 20 L sheath fluid, spare sample needle
171000205	Bio-Plex 200 System with HTF , same as #171000201 with high-throughput fluidics (HTF)

Bio-Plex 200 Accessories and Replacement Parts

171203050	Bio-Plex Reservoir
171000055	Sheath Fluid , 1x, 20 L
171002002	Communication Cable , 3' CAN BUS cable, connects the array reader with the HTF system
171002003	Communication Cable , 5' USB cable, connects the array reader with a PC USB port
171002010	Sheath Fluid Bottle , 1 L
171002012	Sheath Waste Bottle , 1 L
171002020	Sample Needle , 4.6" (11.6 cm)
171002024	Alignment Guide , aligns the array reader on the microplate platform
171002026	Needle Adjustment Wrench
171002030	Protective Shield for Sample Needle
171002032	Air Intake Filter
171002033	Syringe Seal
171002034	Syringe Seal with Cylinder
171002038	Sheath Fluid Filter with Quick Connect Tubing , pkg of 1, replacement maintenance part for internal fluidics system on the Bio-Plex 200 system; removes >5 µm diameter particles
171002040	Sheath Cube Filter , pkg of 1, replacement maintenance part for use with high-throughput fluidics (HTF) system and Bio-Plex 200 system; removes >10 µm diameter particles
171002056	HTF Tubing , pkg of 1, air tubing HTF to reader, sheath tubing HTF to reader, tubing sheath container to HTF (including 10 µm filter), waste tubing (reader to waste container)
171002023	Needle Guide , allows sample needle access to microplates

Bio-Plex 200 System Performance Validation and Calibration Tools

171203001	Bio-Plex Validation Kit 4.0 , includes optics validation, reporter validation, classify validation, and fluidics validation bead sets for approximately 50 validation routines using Bio-Plex Manager software, current version (Standard or Security Edition), and MCV plate IV
171203033	Bio-Plex MCV Plate IV , for use with Bio-Plex Manager software, current version (Standard or Security Edition), and validation kit 4.0
171203060	Bio-Plex Calibration Kit , includes Cal1 and Cal2 calibration beads for approximately 50 daily calibration routines

Bio-Plex 3D Multiplex System

The Bio-Plex 3D multiplex system is the next-generation multiplexing platform based on xMAP technology. Expanded multiplexing capability, faster time to results, and automation capability make it the platform of choice for high-throughput testing for nucleic acid and protein applications.

Features include:

- Rapid read times — twice as fast as with the Bio-Plex 200 system
- Measurement of up to 500 unique analytes in a single sample
- 96- and 384-well plate capability
- Laboratory information system (LIMS/LIS)-compatible software
- Automation-compatible tray design and software
- Robotics interfacing capabilities
- Compatibility with magnetic or nonmagnetic assays
- Bio-Plex Manager software for data analysis
- On-site training

For More Information

Web: bio-rad.com/bio-plex3D

Download bulletins: 5967 and 5980



Bio-Plex 3D Suspension Array System with Bio-Plex Manager Software

System Throughput Capabilities

Test (50 µl well volume, 2,500 beads/well)	Read Time*	Tests/Hr
96-well (100-plex)	18 min	32,000
384-well (100-plex)	1 hr 15 min	30,700
96-well (500-plex)	45 min	64,000
384-well (500-plex)	2 hr 15 min	85,000

* Read times measured across four instruments. Actual results may vary.

Ordering Information

Catalog #	Description
BioPlex3D	Bio-Plex 3D Multiplex System , includes Bio-Plex 3D multiplex system, xPONENT acquisition software, PC, calibration and verification reagents, Bio-Plex Manager desktop license
892018500001*	xPONENT 21 CFR Part 11 Software Module , enables U.S. FDA 21 CFR Part 11 compliance
892018700001*	xPONENT Automation Module , enables interfacing with robotics workstations
171022001*	Swivel Base , allows rotation of the instrument away from the robotics workstation for maintenance and sample loading
892018600001*	xPONENT LIS Software Module , enables interfacing with LIMS/LIS databases
892018200001*	xPONENT Extra Seat Licenses , 3 additional seats of xPONENT software
FM3DCALK25	Bio-Plex 3D Calibration Kit , good for 25 uses; includes reagents, CD, 25 stripwells
FM3DPVERK25	Bio-Plex 3D Performance Verification Kit , good for 25 uses; kit includes reagents, fluidics, CD, 25 stripwells

* All additional accessories may be purchased through Bio-Rad Laboratories, Inc. at the time of system purchase. Post-system purchase accessories must be purchased directly from Luminex Corporation.

Bio-Plex MAGPIX Multiplex Reader Accessories and Software

Ordering Information

Catalog # Description

Kits and Reagents

171213003	Bio-Plex MAGPIX Drive Fluid , 4 x 700 ml drive fluid for use with Bio-Plex MAGPIX multiplex reader
171213001	Bio-Plex MAGPIX Calibration Kit , calibration kit good for 25 uses; kit includes 5 ml calibrator, microspheres, CD, pkg of 25 8-well strips
171213002	Bio-Plex MAGPIX Verification Kit , verification kit good for 25 uses; kit includes MAGPIX verifier, 5 ml of microspheres, MAGPIX fluidics 1, MAGPIX fluidics 2, MAGPIX performance verification kit CD, pkg of 25 8-well strips

Bio-Plex MAGPIX Accessories

171012004	Bio-Plex MAGPIX Replacement Waste Fluid Container , pkg of 1, 850 ml container, holds waste fluid, for use with Bio-Plex MAGPIX reader
171012005	Bio-Plex MAGPIX Sample Probe , sample probe needle for use with Bio-Plex MAGPIX multiplex reader
171012006	Bio-Plex MAGPIX Sample Probe Height Adjustment Kit , sample probe height adjustment kit for use with Bio-Plex MAGPIX multiplex reader
171012008	Bio-Plex MAGPIX 96-Well Plate Heater Block , 96-well plate heater block for use with Bio-Plex MAGPIX multiplex reader
30034376	Bio-Plex Pro Wash Station , for magnetic bead-based assays, includes magnetic plate carrier, waste bottle, 2 liquid bottles
171020100	Bio-Plex Handheld Magnetic Washer , includes magnetic washer and adjustment hex tools for use in manual wash steps for all Bio-Plex magnetic assays
171061000	Bio-Plex Probe Height Adjustment Plate , replacement plate for Bio-Plex MAGPIX multiplex reader

Bio-Plex Pro Washing Accessories

Automated Bio-Plex Pro Wash Station

The Bio-Plex Pro wash station streamlines multiplex assays by eliminating manual wash steps. Bio-Plex Pro wash stations help decrease variability and increase consistency in results between experiments and are specifically designed to perform Bio-Plex assay wash steps. Benefits include:

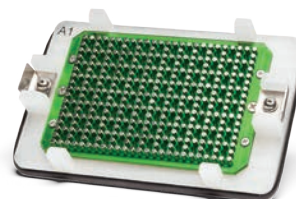
- Reliable and reproducible results
- Optimized onboard protocols
- Simple ELISA-like workflow

The Bio-Plex Pro wash station incorporates a magnetic plate carrier for simple and reliable hands-free washing of 96-well plates.

Wash stations include preset wash programs that have been optimized for Bio-Plex assays.

Bio-Plex Handheld Magnetic Washer

The Bio-Plex handheld magnetic washer is used in manual wash steps for all Bio-Plex magnetic assays.



Ordering Information

Catalog #	Description
30034376	Bio-Plex Pro Wash Station , includes magnetic plate carrier, waste bottle, 2 buffer bottles for use with magnetic beads
171020100	Bio-Plex Handheld Magnetic Washer , includes magnetic washer and adjustment hex tools for washing all Bio-Plex magnetic assays

Accessories

171025001	Bio-Plex Pro Flat Bottom Plates , 40 x 96-well plates, for washing magnetic beads using the Bio-Plex Pro or Bio-Plex Pro II wash stations
171304500	Bio-Plex Wash Buffer , 1.5 L
171304502	Filter Plate , 1 x 96-well filter plate with clear plastic lid, plate holder tray, for washing nonmagnetic beads using the Bio-Plex Pro II wash station, optional vacuum manifold; sealing tape not included

Bio-Plex Manager Software, Standard Edition

Bio-Plex Manager software is a comprehensive, all-in-one software package that provides advanced data analysis for multiplex assays.

Simple Operation

- Ability to self train — just follow the steps outlined on the screen
- Familiar Windows interface — no new terms or menus to learn

Save Time

- Simplified input — values for standards are easy to enter; automatic addition of new lots reduces setup time
- Automated data processing — proprietary algorithm automatically sets the appropriate dynamic range and identifies data points outside this range
- Immediate recalculation of results efficiently updates data when settings are changed

Use Tools That Meet Your Unique Needs

- Superior sensitivity and dynamic range with onboard Brendan Scientific StatLIA 4PL and 5PL weighted curve-fitting models
- Data normalization using multiple internal controls (housekeeping genes) for gene expression applications
- Gene Manager analysis module for presence and absence analysis, pathogen detection, and genotyping applications

Analyze Data with Easy-to-Use Reports

- Automated export of standard curve graphs
- View of all wells or summary (average) of replicate samples
- Data organized by sample type, group, or well
- One-click navigation between analytes
- Flexible data presentation

Data Export, Cross-Platform Capabilities, and System Compatibility

- Import and analyze data from xPONENT and other third-party software
- Use any commercial or custom xMAP assay built on any Luminex microsphere
- Copy and paste data into popular word processing and presentation software applications
- Export to text, XML, and Excel in column or 96-well format
- Analyze data in LIMS and other third-party software by customizing export options
- Request Bio-Plex Manager 4.1.1 software for installation on Luminex systems with IS 2.3 software

Bio-Plex Manager Software Licenses

License	Capabilities and Uses
Instrument control	Full-system, data acquisition and analysis; included with all Bio-Plex 200 systems
Desktop	Single-user license for protocol setup and data analysis; does not control the array reader
Network	Multiuser (5, 10, 25, or 50) licenses for data access from a server; does not control the array reader
Security Edition	Enables U.S. FDA 21 CFR Part 11 compliance

System Requirements

CPU	Pentium 4 or higher, PC only
Operating system	Windows XP Professional, Windows 7, Windows 10

For More Information

Web: bio-rad.com/bio-plexmanager
 Download bulletin: 5613

Ordering Information

Catalog #	Description
171STND01	Bio-Plex Manager Software , 1-user desktop license to analyze Bio-Plex data and generate protocols, does not operate the instrument
171STND05	Bio-Plex Manager Software , 5-user desktop license to analyze Bio-Plex data and generate protocols, does not operate the instrument
171STND10	Bio-Plex Manager Software , 10-user desktop license to analyze Bio-Plex data and generate protocols, does not operate the instrument
171STND25	Bio-Plex Manager Software , 25-user desktop license to analyze Bio-Plex data and generate protocols, does not operate the instrument

Contact Bio-Rad Technical Support to verify whether your current system is compatible with these software products.

Bio-Plex Manager Software Conversions and Upgrades

Bio-Plex Manager software conversions and upgrades allow you to upgrade previous versions of Bio-Plex Manager or convert non Bio-Plex systems to run like a Bio-Plex 200 system.

- **Preprogrammed routine processes** — automate startup, calibration, validation, run, and shutdown
- **Unattended routine operations** — program pre- and post-run maintenance operations to save time

Ordering Information

Catalog #	Description
171STND23	Bio-Plex Manager Software for IS 2.3 System , system license most current version, for converting Luminex IS and xPONENT systems
171SUPG30	Bio-Plex Manager Software for 3.0 Instrument Control Software , system license for upgrading standard or security software version 3.0 to current Bio-Plex Manager version (Security Edition upgrade requires #171SCRT00)
171SUPG40	Bio-Plex Manager Software for 4.0 Instrument Control Software , system license for upgrading the standard or security software version 4.0 to current Bio-Plex Manager version (Security Edition upgrade requires #171SCRT00)
171SUPG41	Bio-Plex Manager Software for 4.1 Instrument Control Software , system license for upgrading the standard or security software version 4.1 to current Bio-Plex Manager version (Security Edition upgrade requires #171SCRT00)
171SUPG50	Bio-Plex Manager Software for 5.0 Instrument Control Software , system license for upgrading the standard or security software version 5.0 to current Bio-Plex Manager version (Security Edition upgrade requires #171SCRT00)

Bio-Plex Multiplex System

Instruments, Software, and Tools

bio-rad.com/bio-plex

Bio-Plex Manager Software, Security Edition

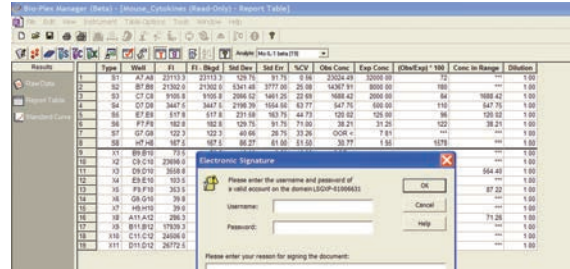
Includes all Standard Edition software features and has built-in security features for U.S. FDA 21 CFR Part 11 compliance:

- Control user log-in with different user levels for access to different functions
- Audit trails
- Secure protocol and data files
- Secure databases for reporting of calibration, validation, and instrument operations

For More Information

Web: bio-rad.com/bio-plexmanager

Download bulletin: 5613



Electronic signature window allows you to bring documents into a secure environment.

Ordering Information

Catalog # Description

- | | |
|-----------|--|
| 171SCRT00 | Bio-Plex Manager Instrument Control License, Security Edition , upgrades workstation with Bio-Plex Manager software, allows compliance with U.S. FDA 21 CFR Part 11 regulations |
| 171SCRT01 | Bio-Plex Manager Software, Security Edition desktop , includes 1-user desktop license, allows compliance with U.S. FDA 21 CFR Part 11 regulations. Does not operate the instrument. |
| 171SCRT05 | Bio-Plex Manager Software, Security Edition desktop , includes 5-user network license, allows compliance with U.S. FDA 21 CFR Part 11 regulations. Does not operate the instrument. |

Contact Bio-Rad Technical Support to verify whether your current system is compatible with these software products.

Bio-Plex Data Pro Software

Bio-Plex Data Pro software simplifies the management and analysis of large datasets generated from multiplex assays. The software allows up to ten data file imports per project; optional Bio-Plex Data Pro Plus software is available for projects with more than ten data file imports.

Organize Data

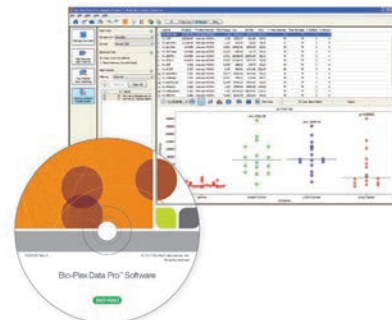
- Merge, import, sort, and filter data from multiple datasets

Automate Calculations

- Perform common calculations and statistical tests quickly and confidently

Visualize Results

- Present data clearly with customized graphs and tables



For More Information and to Download a Free Trial
Web: bio-rad.com/datapro

Ordering Information

Catalog # Description

- | | |
|-----------|--|
| 171001513 | Bio-Plex Data Pro Software , includes 5 Bio-Plex Data Pro software licenses |
| 171001523 | Bio-Plex Data Pro Plus Software , includes 5 Bio-Plex Data Pro Plus software licenses |

Bio-Plex Assays

Bio-Plex Pro Human Inflammation Assays

Human Inflammation Assays

The Bio-Plex Pro human inflammation assays consist of 37 assays for biomarkers associated with inflammation pathways and consist of a 37-plex and Treg cytokine 12-plex assay and 37 singleplex sets that can be combined for a custom multiplex kit.

The assays are built on magnetic beads to enable robust quantification of multiple proteins in human serum, plasma, and cell culture media samples. These assays are perfect for broad research applications, including academic and preclinical studies in:

- Inflammation
- Autoimmune diseases
- Cancer research

Key features include:

- **Reproducibility** — validated to meet analytical standards
- **Speed to results** — Up to 2,886 data points in 4 hours
- **Flexible ordering options** — order either premixed all-in-one kits or singleplex sets, or customize your assay with the Bio-Plex assay builder (bio-rad.com/assaybuilder)

The Bio-Plex Pro human inflammation panel includes the following targets:

APRIL / TNFSF13	sIL-6R α	IL-27 (p28)	Osteocalcin
BAFF / TNFSF13B	IL-8	IL-28A / IFN- λ 2	Osteopontin
sCD30 / TNFRSF8	IL-10	IL-29 / IFN- λ 1	Pentraxin-3
sCD163 Set	IL-11	IL-32	sTNFR-1
Chitinase 3-like 1	IL-12 (p40)	IL-34	sTNFR-2
gp130 / sIL-6R β	IL-12 (p70)	IL-35	TSLP
IFN- α 2	IL-19	LIGHT / TNFSF14	TWEAK / TNFSF12
IFN- β	IL-20	MMP-1	
IFN- γ	IL-22	MMP-2	
IL-2	IL-26	MMP-3	

For More Information

Web: bio-rad.com/bio-plexhumaninflammation
 Request or download bulletin: 6625

Ordering Information

Catalog # Description

Bio-Plex Pro Human Inflammation Premixed All-in-One Kits

171AL001M	Bio-Plex Pro Human Inflammation Panel 1, 37-Plex , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, control, buffers, diluents, streptavidin-PE, 96-well plate, and sealing tape, for the detection of 37 human inflammation biomarkers
171AL003M	Bio-Plex Pro Human Inflammation Treg Cytokine Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, control, buffers, diluents, streptavidin-PE, 96-well plate, and sealing tape, for the detection of 12 human Treg biomarkers

continues

Ordering Information

Catalog # Description

Bio-Plex Pro Human Inflammation Singleplex Sets

171BL001M	APRIL / TNFSF13 Set	171BL021M	IL-27 (p28) Set
171BL002M	BAFF / TNFSF13B Set	171BL022M	IL-28A / IFN- λ 2 Set
171BL003M	sCD30 / TNFRSF8 Set	171BL023M	IL-29 / IFN- λ 1 Set
171BL004M	sCD163 Set	171BL024M	IL-32 Set
171BL005M	Chitinase 3-Like 1 Set	171BL025M	IL-34 Set
171BL006M	gp130 / sIL-6R β Set	171BL026M	IL-35 Set
171BL007M	IFN- α 2 Set	171BL027M	LIGHT / TNFSF14 Set
171BL008M	IFN- β Set	171BL028M	MMP-1 Set
171BL009M	IFN- γ Set	171BL029M	MMP-2 Set
171BL010M	IL-2 Set	171BL030M	MMP-3 Set
171BL011M	sIL-6R α Set	171BL031M	Osteocalcin Set
171BL012M	IL-8 Set	171BL032M	Osteopontin Set
171BL013M	IL-10 Set	171BL033M	Pentraxin-3 Set
171BL014M	IL-11 Set	171BL034M	sTNFR-1 Set
171BL015M	IL-12 (p40) Set	171BL035M	sTNFR-2 Set
171BL016M	IL-12 (p70) Set	171BL036M	TSLP Set
171BL017M	IL-19 Set	171BL037M	TWEAK / TNFSF12 Set
171BL018M	IL-20 Set	171DL0001	Std, 1PK
171BL019M	IL-22 Set	171DL0050	Std, 50PK
171BL020M	IL-26 Set		

Standards

171DL0001	Bio-Plex Pro Human Inflammation Panel 1, 37-Plex Standard, pkg of 1 vial, lyophilized mixture of 37 standard analytes
171DL0050	Bio-Plex Pro Human Inflammation Panel 1, 37-Plex Standard, pkg of 50 lot-matched vials, lyophilized mixture of 37 standard analytes

Reagent Kit – for use with human inflammation singleplex sets

171304090M	Bio-Plex Pro Reagent Kit III, 1 x 96-well, includes detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods
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Bio-Plex Pro Cytokine, Chemokine, and Growth Factor Assays

Bio-Plex Pro cytokine, chemokine, and growth factor assays are magnetic bead-based multiplex immunoassays offering accurate and reproducible measurements of multiple analytes simultaneously. These assays have been developed to provide reliable performance with the flexibility required to meet all of your research needs. Assays are available for human, mouse, or rat studies.

Key features includes:

- **Magnetic beads** — automated plate washing and improved reproducibility across experiments
- **Increased productivity** — measure multiple analytes simultaneously, get results in about 3 hours
- **Flexible ordering options** — order either premixed all-in-one kits or singleplex sets, or customize your assay with the Bio-Plex assay builder (bio-rad.com/assaybuilder)

- **Cross-platform compatibility** — can be used with all xMAP life science instruments supplied by any Luminex partner
- **Convenient pathway panels** — Th17, Th1/Th2, and TGF- β available

For More Information

Web: bio-rad.com/CCGFassays

Download bulletins: 5828 and 6100

Request or download bulletins: 6054 and 6110

Human Assays

Human Assays – Available Analytes

6Ckine / CCL21	IL-1 α	IL-18	PDGF-BB
Basic FGF	IL-1 β *	IP-10 / CXCL10*	RANTES
BCA-1 / CXCL13	IL-1ra	I-TAC / CXCL11	SCF
CTACK / CCL27*	IL-2*	LIF	SCGF- β
ENA-78 / CXCL5	IL-2R α	MCP-1 / CCL2*	SCYB16 / CXCL16
Eotaxin / CCL11*	IL-3	MCP-2 / CCL8	SDF-1 α
Eotaxin-2 / CCL24	IL-4*	MCP-3 / CCL7*	SDF-1 α + β / CXCL12
Eotaxin-3 / CCL26	IL-5	MCP-4 / CCL13	TARC / CCL17
Fractalkine / CX3CL1	IL-6*	M-CSF	TECK / CCL25
GCP-2 / CXCL6	IL-7	MDC / CCL22	TGF- β 1
G-CSF	IL-8 / CXCL8*	MIF*	TGF- β 2
GM-CSF*	IL-9	MIG / CXCL9*	TGF- β 3
Gro- α / CXCL1*	IL-10*	MIP-1 α / CCL3*	TNF- α *
Gro- β / CXCL2	IL-12 (p40)	MIP-1 β	TNF- β
HGF	IL-12 (p70)	MIP-1 δ / CCL15	TRAIL
I-309 / CCL1	IL-13	MIP-3 α / CCL20	VCAM-1
ICAM-1	IL-15	MIP-3 β / CCL19	VEGF
IFN- α 2	IL-16*	MPIF-1 / CCL23	
IFN- γ *	IL-17A	β -NGF	

* Analyte is present in multiple panels. If multiplexing, select analytes from the same panel to avoid cross reactivity.

Ordering Information

Catalog # Description

Human Cytokine Premixed All-in-One Kits*

12007283	Bio-Plex Pro Human Cytokine 48-Plex Panel , 1 x 96-well, includes coupled magnetic capture beads, premixed detection antibodies, standards, quality control, detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, 10x wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, and instructions for the detection of FGF basic, Eotaxin, G-CSF, GM-CSF, IFN- γ , IL-1 β , IL-1ra, IL-1 α , IL-2R α , IL-3, IL-12 (p40), IL-16, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, GRO- α , HGF, IFN- α 2, LIF, MCP-3, IL-10, IL-12 (p70), IL-13, IL-15, IL-17A, IP-10, MCP-1 / CCL2, MIG, β -NGF, SCF, SCGF- β , SDF-1 α , MIP-1 α , MIP-1 β , PDGF-BB, RANTES, TNF- α , VEGF, CTACK, MIF, TRAIL, IL-18, M-CSF, TNF- β
M50000007A	Bio-Plex Pro Human Cytokine 8-Plex Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-2, IL-4, IL-6, IL-8, IL-10, GM-CSF, IFN- γ , TNF- α
M5000031YV	Bio-Plex Pro Human Cytokine 17-Plex Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-1 β , IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-10, IL-12 (p70), IL-13, IL-17, G-CSF, GM-CSF, IFN- γ , MCP-1, MIP-1 β , TNF- α
M500KCAFOY	Bio-Plex Pro Human Cytokine 27-Plex Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-1 β , IL-1ra, IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-9, IL-10, IL-12 (p70), IL-13, IL-15, IL-17, basic FGF, eotaxin, G-CSF, GM-CSF, IFN- γ , IP-10, MCP-1, MIP-1 α , MIP-1 β , PDGF-BB, RANTES, TNF- α , VEGF
M5000005L3	Bio-Plex Pro Human Cytokine Th1/Th2 Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-2, IL-4, IL-5, IL-10, IL-12 (p70), IL-13, GM-CSF, IFN- γ , TNF- α
12007975	Bio-Plex Pro Human Immunotherapy 20-Plex Panel , 1 x 96-well, includes coupled magnetic capture beads, premixed detection antibodies, standards, quality control, detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, 10x wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, and instructions for the detection of GM-CSF, IFN- γ , IL-2, IL-4, IL-5, IL-6, IL-7, IL-8, IL-10, IL-13, IL-15, IL-17A, IL-18, IP-10, MCP-1, MIG, MIP-1 α , MIP-1 β , RANTES, TNF- α

continues

Ordering Information

Catalog # Description

Bio-Plex Pro Human Cytokine Singleplex Sets, Group I and II, 1 x 96-Well**

171B5001M	IL-1β Set	171B5026M	TNF-α Set
171B5002M	IL-1ra Set	171B5027M	VEGF Set
171B5003M	IL-2 Set	171B6001M	IL-1α Set
171B5004M	IL-4 Set	171B6002M	IL-2Rα Set
171B5005M	IL-5 Set	171B6003M	IL-3 Set
171B5006M	IL-6 Set	171B6004M	IL-12 (p40) Set
171B5007M	IL-7 Set	171B6005M	IL-16 Set
171B5008M	IL-8 Set	171B6006M	CTACK Set
171B5009M	IL-9 Set	171B6007M	GRO-α Set
171B5010M	IL-10 Set	171B6008M	HGF Set
171B5011M	IL-12 (p70) Set	171B6009M	ICAM-1 Set
171B5012M	IL-13 Set	171B6010M	IFN-α2 Set
171B5013M	IL-15 Set	171B6011M	LIF Set
171B5014M	IL-17A Set	171B6012M	MCP-3 Set
171B5015M	Eotaxin Set	171B6013M	M-CSF Set
171B5016M	Basic FGF Set	171B6014M	MIF Set
171B5017M	G-CSF Set	171B6015M	MIG Set
171B5018M	GM-CSF Set	171B6016M	β-NGF Set
171B5019M	IFN-γ Set	171B6017M	SCF Set
171B5020M	IP-10 Set	171B6018M	SCGF-β Set
171B5021M	MCP-1 Set	171B6019M	SDF-1α Set
171B5022M	MIP-1α Set	171B6020M	TNF-β Set
171B5023M	MIP-1β Set	171B6021M	TRAIL Set
171B5024M	PDGF-BB Set	171B6022M	VCAM-1 Set
171B5025M	RANTES Set		

Note: IL-18 is available only in multiplex format.

Standards

12007919	Bio-Plex Pro Human Cytokine Screening Panel Standards , pkg of 1 vial, cytokine standard for detecting 50 human cytokines
12007920	Bio-Plex Pro Human Cytokine Screening Panel Standards , pkg of 50 vials, cytokine standard for detecting 50 human cytokines

Reagent Kit — for use with human cytokine singleplex sets

171304090M	Bio-Plex Pro Reagent Kit III , 1 x 96-well, includes detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods
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* Please contact your local Bio-Rad Sales Representative for pricing and availability of 10 x 96-well assay kits.

** Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards. Singleplex sets should not be mixed with others from different panels or groups.

Human Th17 Premixed All-in-One Kit

171AA001M	Bio-Plex Pro Human Th17 Cytokine 15-Plex Panel , 1 x 96-well, includes premixed coupled magnetic beads, detection antibodies, standards, 2-level controls, detection antibody diluent, standard diluent HB, sample diluent HB, assay buffer, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, and instructions, for detecting IL-1 β , IL-4, IL-6, IL-10, IL-17A, IL-17F, IL-21, IL-22, IL-23, IL-25, IL-31, IL-33, IFN- γ , sCD40L, TNF- α , (IL-17A/F available as singleplex only)
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Bio-Plex Pro Human Th17 Cytokine Singleplex Sets, 1 x 96-Well**

171BA001M	IL-1β	171BA009M	IL-23
171BA002M	IL-4	171BA010M	IL-25
171BA003M	IL-6	171BA011M	IL-31
171BA004M	IL-10	171BA012M	IL-33
171BA005M	IL-17A	171BA013M	IFN-γ
171BA006M	IL-17F	171BA014M	sCD40L
171BA007M	IL-21	171BA015M	TNF-α
171BA008M	IL-22	171BA016M	IL-17A/F

continues

Ordering Information

Catalog # Description

Standards

171DA0001 **Bio-Plex Pro Human Th17 Cytokine Standard**, pkg of 1 vial, lyophilized mixture of 16 standard analytes
 171DA0501 **Bio-Plex Pro Human Th17 Cytokine Standard**, pkg of 50 lot-matched vials, lyophilized mixture of 16 standard analytes

Reagent Kit III – for use with human Th17 cytokine singleplex sets

171304090M **Bio-Plex Pro Reagent Kit III**, 1 x 96-well, includes detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods

Human Chemokine Premixed All-in-One Kit

171AK99MR2 **Bio-Plex Pro Human Chemokine Panel 40-Plex**, 1 x 96-well, includes premixed coupled magnetic beads, detection antibodies, standards, single-level controls, detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, and instructions, for detecting 40 human chemokines shown below.

Bio-Plex Pro Human Chemokine Singleplex Sets, 1 x 96-Well**

171BK11MR2	6Ckine / CCL21 Set	171BK33MR2	IL-16 Set
171BK12MR2	BCA-1 / CXCL13 Set	171BK34MR2	IP-10 / CXCL10 Set
171BK13MR2	CTACK / CCL27 Set	171BK35MR2	I-TAC / CXCL11 Set
171BK14MR2	ENA-78 / CXCL5 Set	171BK36MR2	MCP-1 / CCL2 Set
171BK15MR2	Eotaxin / CCL11 Set	171BK37MR2	MCP-2 / CCL8 Set
171BK16MR2	Eotaxin-2 / CCL24 Set	171BK38MR2	MCP-3 / CCL7 Set
171BK17MR2	Eotaxin-3 / CCL26 Set	171BK39MR2	MCP-4 / CCL13 Set
171BK18MR2	Fractalkine / CX3CL1 Set	171BK41MR2	MDC / CCL22 Set
171BK19MR2	GCP-2 / CXCL6 Set	171BK42MR2	MIF Set
171BK21MR2	GM-CSF Set	171BK43MR2	MIG / CXCL9 Set
171BK22MR2	Gro-α / CXCL1 Set	171BK44MR2	MIP-1α / CCL3 Set
171BK23MR2	Gro-β / CXCL2 Set	171BK46MR2	MIP-1δ / CCL15 Set
171BK24MR2	I-309 / CCL1 Set	171BK47MR2	MIP-3α / CCL20 Set
171BK25MR2	IFN-γ Set	171BK48MR2	MIP-3β / CCL19 Set
171BK26MR2	IL-1β Set	171BK49MR2	MPIF-1 / CCL23 Set
171BK27MR2	IL-2 Set	171BK51MR2	SCYB16 / CXCL16 Set
171BK28MR2	IL-4 Set	171BK52MR2	SDF-1α+β / CXCL12 Set
171BK29MR2	IL-6 Set	171BK53MR2	TARC / CCL17 Set
171BK31MR2	IL-8 / CXCL8 Set	171BK54MR2	TECK / CCL25 Set
171BK32MR2	IL-10 Set	171BK55MR2	TNF-α Set

Standard

171DK0001 **Bio-Plex Pro Human Chemokine Standard**, pkg of 1 vial, lyophilized mixture of 40 standard analytes

Reagent Kit III – for use with human chemokine singleplex sets

171304090M **Bio-Plex Pro Reagent Kit III**, 1 x 96-well, includes detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods

** Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards. Singleplex sets should not be mixed with others from different panels or groups.

Mouse Assays

Mouse Assays — Available Analytes

Basic FGF	IFN- γ	IL-15	I-TAC / CXCL11	MIP-3 α / CCL20
BCA-1 / CXCL13	IL-1 α	IL-16	KC / CXCL1	MIP-3 β / CCL19
CD40L	IL-1 β	IL-17A	LIF	PDGF-BB
CTACK / CCL27	IL-2	IL-17F	M-CSF	RANTES / CCL5
ENA-78 / CXCL5	IL-3	IL-18	MCP-1 / MCAF / CCL2	SCYB16 / CXCL16
Eotaxin / CCL11	IL-4	IL-21	MCP-2 / CCL8	SDF-1 α / CXCL12
Eotaxin-2 / CCL24	IL-5	IL-22	MCP-3 / CCL7	TARC / CCL17
Fractalkine / CX3CL1	IL-6	IL-23	MCP-5 / CCL12	TECK / CCL25
G-CSF	IL-9	IL-25 / IL-17E	MDC / CCL22	TGF- β 1
GM-CSF	IL-10	IL-27	MIG / CXCL9	TGF- β 2
Gro / KC	IL-12 (p40)	IL-31	MIP-1 α / CCL3	TGF- β 3
I-309 / CCL1	IL-12 (p70)	IL-33	MIP-1 β / CCL4	TNF- α
ICAM-1	IL-13	IP-10 / CXCL10	MIP-2 / CXCL2	VEGF

Ordering Information

Catalog #	Description
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Mouse Cytokine Premixed All-in-One Kits*

M6000007A	Bio-Plex Pro Mouse Cytokine 8-Plex Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-1 β , IL-2, IL-4, IL-5, IL-10, GM-CSF, IFN- γ , TNF- α
MD000000EL	Bio-Plex Pro Mouse Cytokine 9-Plex Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-15, IL-18, basic FGF, LIF, M-CSF, MIG, MIP-2, PDGF-BB, VEGF
M60009RDPD	Bio-Plex Pro Mouse Cytokine 23-Plex Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-1 α , IL-1 β , IL-2, IL-3, IL-4, IL-5, IL-6, IL-9, IL-10, IL-12 (p40), IL-12 (p70), IL-13, IL-17, eotaxin, G-CSF, GM-CSF, IFN- γ , KC, MCP-1, MIP-1 α , MIP-1 β , RANTES, TNF- α
M6000003J7	Bio-Plex Pro Mouse Cytokine Th1/Th2 Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of IL-2, IL-4, IL-5, IL-10, IL-12 (p70), GM-CSF, IFN- γ , TNF- α

Mouse Th17 Premixed All-in-One Kits

M6000007NY	Bio-Plex Pro Mouse Cytokine Th17 6-Plex Group I , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standard, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, and instructions, for the detection of IL-1 β , IL-6, IL-10, IL-17A, IFN- γ , TNF- α
12010828	Bio-Plex Pro Mouse Th17 Cytokine 10-Plex , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of CD40L, IL-17F, IL-21, IL-22, IL-23, IL-25 / IL17E, IL-27, IL-31, IL-33, MIP-3 α
171GA010M	Bio-Plex Pro Mouse Cytokine ICAM-1 Set , 1 x 96-well, includes coupled magnetic beads and detection antibodies for ICAM-1, requires reagent kit V (#12002798) and standards (#171A0001)

* Please contact your local Bio-Rad Sales Representative for pricing and availability of 10 x 96-well assay kits.

continues

Ordering Information

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Mouse Cytokine Singleplex Sets, Group I, 1 x 96-Well*			
171G5001M	IL-1 α Set	171G5013M	IL-17A Set
171G5002M	IL-1 β Set	171G5014M	Eotaxin Set
171G5003M	IL-2 Set	171G5015M	G-CSF Set
171G5004M	IL-3 Set	171G5016M	GM-CSF Set
171G5005M	IL-4 Set	171G5017M	IFN- γ Set
171G5006M	IL-5 Set	171G5018M	KC Set
171G5007M	IL-6 Set	171G5019M	MCP-1 Set
171G5008M	IL-9 Set	171G5020M	MIP-1 α Set
171G5009M	IL-10 Set	171G5021M	MIP-1 β Set
171G5010M	IL-12 (p40) Set	171G5022M	RANTES Set
171G5011M	IL-12 (p70) Set	171G5023M	TNF- α Set
171G5012M	IL-13 Set		

Standards

171I50001	Bio-Plex Pro Mouse Cytokine Standards Group I, pkg of 1 vial, lyophilized mixture of 23 analytes
171I10501	Bio-Plex Pro Mouse Cytokine Standards Group I, pkg of 50 lot-matched vials, lyophilized mixture of 23 analytes

Bio-Plex Pro Mouse Cytokine Singleplex Sets, Group II, 1 x 96-Well*

171G6001M	IL-15 Set	171G6005M	MIG Set
171G6002M	Basic FGF Set	171G6006M	MIP-2 Set
171G6003M	LIF Set	171G6007M	PDGF-BB Set
171G6004M	M-CSF Set	171G6008M	VEGF Set

Standards

171I60001	Bio-Plex Pro Mouse Cytokine Standards Group II, pkg of 1 vial, lyophilized mixture of 9 analytes
171I10502	Bio-Plex Pro Mouse Cytokine Standards Group II, pkg of 50 lot-matched vials, lyophilized mixture of 9 analytes

Bio-Plex Pro Mouse Th17 Cytokine Singleplex Sets, 1 x 96-Well*

171GA001M	CD40L Set	171GA007M	IL-27 Set
171GA002M	IL-17F Set	171GA008M	IL-31 Set
171GA003M	IL-21 Set	171GA009M	IL-33 Set
171GA004M	IL-22 Set	171GA010M	ICAM-1 Set
171GA005M	IL-23 Set	171GA011M	MIP-3 α Set
171GA006M	IL-25 Set		

Standards

171IA0001	Bio-Plex Pro Mouse Th17 Cytokine Standards, pkg of 1 vial, lyophilized mixture for detecting 11 analytes
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Reagent Kits

12002798	Bio-Plex Pro Reagent Kit V, 1 x 96-well, includes detection antibody diluent HP, standard diluent, sample diluent, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods
12005847	Bio-Plex Pro Reagent Kit V, 10 x 96-well, includes detection antibody diluent HP, standard diluent, sample diluent, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods
171304080M	Bio-Plex Pro High Dilution Reagent Kit, 1 x 96-well, includes assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent

Bio-Plex Pro Mouse Chemokine Panel

12009159	Bio-Plex Pro Mouse Chemokine 31-Plex MCP-2 / CCL2 Set, 1 x 96-well
12002247	Bio-Plex Pro Mouse Chemokine, MCP-2 / CCL8 Set, 1 x 96-well
12002254	Bio-Plex Pro Mouse Chemokine MIP-2 / CXCL2 Set, 1 x 96-well
12002260	Bio-Plex Pro Mouse Chemokine TECK / CCL25 Set, 1 x 96-well
12002798	Bio-Plex Pro Reagent Kit V, 1 x 96-well
12002796	Bio-Plex Pro Mouse Chemokine Standards, 1 pack

* Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards. Singleplex sets should not be mixed with others from different panels or groups.

Rat Assays

Rat Assays — Available Analytes

G-CSF	IL-5	IL-18*	TGF- β 1
GM-CSF	IL-6	KC	TGF- β 2
Gro / KC	IL-7	MCP-1	TGF- β 3
IFN- γ	IL-10	M-CSF	TNF- α
IL-1 α	IL-12 (p40)	MIP-1 α	VEGF
IL-1 β	IL-12 (p70)	MIP-2	
IL-2	IL-13	MIP-3 α	
IL-4	IL-17A	RANTES	

* IL-18 is not available as a singleplex.

Ordering Information

Catalog #	Description
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Rat Cytokine Premixed All-in-One Kits*

12005641	Bio-Plex Pro Rat Cytokine 23-Plex Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent HP, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of G-CSF, GM-CSF, Gro/KC, IFN- γ , IL-1 α , IL-1 β , IL-2, IL-4, IL-5, IL-6, IL-7, IL-10, IL-12 (p70), IL-13, IL-17A, IL-18, MCP-1, M-CSF, MIP-1 α , MIP-3 α , RANTES, TNF- α , VEGF
171K1002M	Bio-Plex Pro Rat Cytokine Th1/Th2 12-Plex Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standard, assay buffer, wash buffer, detection antibody diluent HP, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent and instructions, for the detection of IL- α , IL-1 β , IL-2, IL-4, IL-5, IL-6, IL-10, IL-12 (p70), IL-13, GM-CSF, IFN- γ , TNF- α

Catalog #	Description	Catalog #	Description
Bio-Plex Pro Rat Cytokine Singleplex Sets, 1 x 96-Well**			
171L1003M	G-CSF Set	171L1015M	IL-12 (p40) Set
171L1004M	GM-CSF Set	171L1016M	IL-12 (p70) Set
171L1005M	Gro / KC Set	171L1017M	IL-13 Set
171L1006M	IFN-γ Set	171L1018M	IL-17A Set
171L1007M	IL-1α Set	171L1020M	M-CSF Set
171L1008M	IL-1β Set	171L1027M	MCP-1 Set
171L1009M	IL-2 Set	171L1021M	MIP-1α Set
171L1010M	IL-4 Set	171L1022M	MIP-2 Set
171L1011M	IL-5 Set	171L1023M	MIP-3α Set
171L1012M	IL-6 Set	171L1024M	RANTES Set
171L1013M	IL-7 Set	171L1025M	TNF-α Set
171L1014M	IL-10 Set	171L1026M	VEGF Set

Standards

171NZ0001	Bio-Plex Pro Rat Cytokine Standards , pkg of 1 vial, lyophilized mixture of 31 analytes. Compatible with rat cytokine and rat diabetes assays
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Reagent Kits — for use with rat cytokine singleplex sets

12002798	Bio-Plex Pro Reagent Kit V , 1 x 96-well, includes detection antibody diluent HP, standard diluent, sample diluent, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods
12005847	Bio-Plex Pro Reagent Kit V , 10 x 96-well, includes detection antibody diluent HP, standard diluent, sample diluent, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods

* Please contact your local Bio-Rad Sales Representative for pricing and availability of 10 x 96-well assay kits.

** Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards. Singleplex sets should not be mixed with others from different panels or groups.

Multi-Species TGF- β Assays

Ordering Information

Catalog # Description

Bio-Plex Pro TGF- β Premixed All-in-One Kit (compatible with human, mouse, and rat samples)

171W4001M **Bio-Plex Pro TGF- β 3-Plex Assay**, 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay buffer, wash buffer, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard diluent, sample diluent, for the detection of TGF- β 1, TGF- β 2, TGF- β 3

Bio-Plex Pro TGF- β Singleplex Sets, 1 x 96-Well*

171V4001M **TGF- β 1 Set**
 171V4002M **TGF- β 2 Set**
 171V4003M **TGF- β 3 Set**

Standards

171X40001 **Bio-Plex Pro TGF- β Standard**, pkg of 1 vial, lyophilized standard for detecting TGF- β 1, TGF- β 2, and TGF- β 3 analytes
 171X40501 **Bio-Plex Pro TGF- β Standard**, pkg of 50 lot-matched vials, lyophilized standard for detecting TGF- β 1, TGF- β 2, and TGF- β 3 analytes

Reagent Kits — for use with TGF- β singleplex sets

171304090M **Bio-Plex Pro Reagent Kit III**, 1 x 96-well, includes detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods
 12005846 **Bio-Plex Pro Reagent Kit III**, 10 x 96-well, includes detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods

Bio-Plex Pro Assay Accessories

171304500 **Bio-Plex Wash Buffer**, 1.5 L
 171025001** **Bio-Plex Pro Flat Bottom Plates**, 40 x 96-well plates
 171304502 **Filter Plate**, 1 x 96-well filter plate with clear plastic lid, plate-holder tray, sealing tape not included

* Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards. Singleplex sets should not be mixed with others from different panels or groups.

** Required for washing Bio-Plex Pro assays or other magnetic bead-based assays using Bio-Plex Pro and Bio-Plex Pro II wash stations.

Note: x-Plex assay panels can be ordered with any combination of available assays. For more information, go to bio-rad.com/bio-plex/assaybuilder.

Bio-Plex Pro Cell Signaling Assays

Cell Signaling Assays

The Bio-Plex Pro cell signaling assays are magnetic bead-based immunoassays designed to meet the sensitivity needs of the most discerning scientists. The multiplex format enables robust, reproducible, and simultaneous measurement of proteins involved in key intracellular signaling pathways. Choose from a broad selection of phosphoprotein and total protein targets to investigate pathways associated with cancer, cardiovascular disorders, inflammation, drug mechanism of action, diabetes, toxicology, and neurological disorders.

These assays incorporate several features to enhance both quality and ease of use:

- Assay quick guide to get you started right away
- Assay protocol optimized for exceptional sensitivity and broad dynamic range
- Flexible ordering options — order singleplex sets or visit bio-rad.com/assaybuilder to configure a custom premixed kit

Bio-Plex Assays

Bio-Plex Pro Cell Signaling Assays

bio-rad.com/bio-plex

Available Assays

Phosphoprotein		Lysate Control*	Catalog #
Akt (Ser ⁴⁷³)	GSK-3 α / β (Ser ²¹ /Ser ⁹)	EGF-treated HEK-293	171YZ0001
Akt (Thr ³⁰⁸)	MEK1 (Ser ²¹⁷ /Ser ²²¹)		
Erk1/2 (Thr ²⁰² /Tyr ²⁰⁴ , Thr ¹⁸⁵ /Tyr ¹⁸⁷)			
c-Jun (Ser ⁶³)	ATF-2 (Thr ⁷¹)	UV-treated HEK-293	171YZ0009
JNK (Thr ¹⁸³ /Tyr ¹⁸⁵)	CREB (Ser ¹³³)		
p38 MAPK (Thr ¹⁸⁰ /Tyr ¹⁸²)	p53 (Ser ¹⁵)		
EGFR (Tyr ¹⁰⁶⁸)	EGFR (Tyr ¹¹⁷³)	EGF-treated HeLa	171YZ0002
HER-2 (Tyr ¹²⁴⁸)	p90 RSK (Ser ³⁸⁰)	EGF-treated SK-BR-3	171YZ0003
HSP27 (Ser ⁷⁸)	S6 ribosomal protein (Ser ²³⁵ /Ser ²³⁶)		
IGF-1R (Tyr ¹¹³¹)	IR- β (Tyr ¹¹⁴⁶)	IGF-1-treated HEK-293	171YZ0005
I κ B- α (Ser ³² /Ser ³⁶)	Smad2 (Ser ⁴⁶⁵ /Ser ⁴⁶⁷)	TNF- α -treated HeLa	171YZ0008
NF- κ B p65 (Ser ⁵³⁶)	IR- β (Tyr ¹¹⁴⁶)		
p70 S6 Kinase (Thr ⁴²¹ /Ser ⁴²⁴)	p70 S6 Kinase (Thr ³⁸⁹)	NGF β -treated PC-12	171YZ0006
PDGFR- α (Tyr ⁷⁵⁴)	IRS-1 (Ser ⁶³⁶ /Ser ⁶³⁹)	PDGF-treated NIH3T3	171YZ0007
PDGFR- β (Tyr ⁷⁵¹)	mTOR (Ser ²⁴⁴⁸)		
BAD (Ser ¹³⁶)	PTEN (Ser ³⁸⁰)		
Stat1 (Tyr ⁷⁰¹)	Stat3 (Tyr ⁷⁰⁵)	IFN- α -treated HeLa	171YZ0004
Stat3 (Ser ⁷²⁷)		VEGF-treated HUVEC	171YZ0010
VEGFR-2 (Tyr ¹¹⁷⁵)			
ZAP-70 (Tyr ³¹⁹)		H ₂ O ₂ -treated Jurkat	171YZ0012
Lyn (Tyr ⁵⁰⁷)	Syk (Tyr ³⁵²)	H ₂ O ₂ -treated Ramos	171YZ0011
c-Abl (Tyr ²⁴⁵)		Untreated K-562	171YZT003
Src (Tyr ⁴¹⁹)		Src-transfected NIH3T3	171YZ0013
Negative control for all phosphoprotein assays		Phosphatase-treated HeLa	171YZB001
Total Target		Lysate Control*	Catalog #
Total Akt	Total JNK	Untreated HeLa	171YZT002
Total Erk 1/2	Total MEK1		
Total GSK-3b	Total mTOR		
Total I κ B- α	Total p38 MAPK	Total Smad2	
		Total IGF-1R	
Total c-Jun		Untreated HEK-293	171YZT001
Total CREB			
Total Src		Src-transfected NIH3T3	171YZ0013
Total Btk		H ₂ O ₂ -treated Ramos	171YZ0011
Total ZAP-70		H ₂ O ₂ -treated Jurkat	171YZ0012
Total HER-2		EGF-treated SK-BR-3	171YZ0003
Negative control for all target assays		Detection antibody diluent**	
Housekeeping Protein		Lysate Control*	Catalog #
Human GAPDH		Untreated HeLa	171YZT002
β -Actin		Untreated HeLa	171YZT002
Negative control for all target assays		Detection antibody diluent**	

* All controls are shipped as one vial of lyophilized cell lysate.

** Included with the Bio-Plex Pro cell signaling reagent kit (#171304006M).

For More Information

Web: bio-rad.com/cellsignalingassays

Download bulletin: 5483

Request or download bulletin: 5405

Ordering Information

Catalog #	Description
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Premixed All-in-One Kits

LQ00006JKOKORR	Bio-Plex Pro Cell Signaling Akt Panel 8-Plex Assay , 1 x 96-well, includes coupled magnetic beads and detection antibodies, buffers, lysis factor QG, diluent, streptavidin-PE, 96-well flat bottom plate, plate seals, for the detection of Akt (Ser473), BAD (Ser136), GSK-3 α / β (Ser21/Ser9), IRS-1 (Ser636/Ser639), mTOR (Ser2248), p70 S6 kinase (Thr389), PTEN (Ser380), S6 ribosomal protein (Ser235/Ser236)
LQ00000S6KL81S	Bio-Plex Pro Cell Signaling MAPK Panel 9-Plex Assay , 1 x 96-well, includes coupled magnetic beads and detection antibodies, buffers, lysis factor QG, diluent, streptavidin-PE, 96-well flat bottom plate, and plate seals for the detection of ATF-2 (Thr71), Erk1/2 (Thr202/Tyr204, Thr185/Tyr187), HSP27 (Ser78), JNK (Thr183/Tyr185), MEK1 (Ser217/Ser221), p38 MAPK (Thr180/Tyr182), p53 (Ser15), p90 RSK (Ser380), Stat3 (Ser727)

Catalog #	Phosphoprotein	Catalog #	Phosphoprotein
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Phosphoprotein Singleplex Sets*

171V50001M	Akt (Ser⁴⁷³) Set	171V50033M	mTOR (Ser²⁴⁴⁸) Set
171V50002M	Akt (Thr³⁰⁸) Set	171V50013M	NF-κB p65 (Ser⁵³⁶) Set
171V50024M	ATF-2 (Thr⁷¹) Set	171V50014M	p38 MAPK (Thr¹⁸⁰/Tyr¹⁸²) Set
171V50025M	BAD (Tyr²²³) Set	171V50034M	p53 (Ser¹⁵) Set
171V50027M	c-Abl (Tyr²⁴⁵) Set	171V50016M	p70 S6 Kinase (Thr³⁸⁹) Set
171V50003M	c-Jun (Ser⁶³) Set	171V50015M	p70 S6 Kinase (Thr⁴²¹/Ser⁴²⁴) Set
171V50028M	CREB (Ser¹³³) Set	171V50035M	p90 RSK (Ser³⁸⁰) Set
171V50004M	EGFR (Tyr¹⁰⁶⁸) Set	171V50017M	PDGFR-α (Tyr⁷⁵⁴) Set
171V50005M	EGFR (Tyr¹¹⁷³) Set	171V50018M	PDGFR-β (Tyr⁷⁵¹) Set
171V50006M	Erk 1/2 (Thr²⁰²/Tyr²⁰⁴, Thr¹⁸⁵/Tyr¹⁸⁷) Set	171V50037M	PTEN (Ser³⁸⁰) Set
171V50007M	GSK-3α/β (Ser²¹/Ser⁹) Set	171V50038M	S6 Ribosomal Protein (Ser²³⁵/Ser²³⁶) Set
171V50008M	HER-2 (Tyr¹²⁴⁹) Set	171V50019M	Smad2 (Ser⁴⁶⁵/Ser⁴⁶⁷) Set
171V50029M	HSP27 (Ser⁷⁸) Set	171V50039M	Src (Tyr⁴¹⁶) Set
171V50009M	IGF-1R (Tyr¹¹³¹) Set	171V50020M	Stat1 (Tyr⁷⁰¹) Set
171V50031M	IR-β (Tyr¹¹⁴⁶) Set	171V50021M	Stat3 (Ser⁷²⁷) Set
171V50030M	IRS-1 (Ser⁶³⁶/Ser⁶³⁹) Set	171V50022M	Stat3 (Tyr⁷⁰⁵) Set
171V50010M	IκB-α (Ser³²/Ser³⁶) Set	171V50040M	Syk (Tyr³⁵²) Set
171V50011M	JNK (Thr¹⁸³/Tyr¹⁸⁵) Set	171V50023M	VEGFR-2 (Tyr¹¹⁷⁵) Set
171V50032M	Lyn (Tyr⁵⁰⁷) Set	171V50041M	ZAP-70 (Tyr³¹⁹) Set
171V50012M	MEK1 (Ser²¹⁷/Ser²²¹) Set		

Total Target Singleplex Sets*

171V60001M	Akt Set	171V60007M	JNK Set
171V60012M	Btk Set	171V60008M	MEK1 Set
171V60002M	c-Jun Set	171V60015M	mTOR Set
171V60013M	CREB Set	171V60009M	p38 MAPK Set
171V60003M	Erk1/2 Set	171V60010M	p70 S6 Kinase Set
171V60004M	GSK-3β Set	171V60016M	PTEN Set
171V60005M	HER-2 Set	171V60011M	Smad2 Set
171V60014M	IGF-1R Set	171V60017M	Src Set
171V60006M	IκB-α Set	171V60018M	ZAP-70 Set

Housekeeping Protein Singleplex Sets*

171V60019M	Human GAPDH Set	171V60020M	β-Actin Set
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Bio-Plex Pro Cell Signaling Reagents — cell signaling reagent kits are required to run the singleplex sets

171304006M	Bio-Plex Pro Cell Signaling Reagent Kit , 1 x 96-well, includes assay cell lysis buffer, cell lysis factor QG, cell wash buffer, bead resuspension buffer, detection antibody diluent, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, instructions
171304515	Bio-Plex Pro Cell Signaling Wash Buffer , 330 ml, for 1 x 96-well assay, for use with Bio-Plex Pro cell signaling assays only, compatible with both magnetic and vacuum separation methods

* Lysate controls are recommended for singleplex sets.

Bio-Plex Pro RBM Apoptosis Assays

Apoptosis Assays

The Bio-Plex Pro RBM apoptosis assays, developed in partnership with Myriad RBM, comprise a highly relevant set of intracellular proteins involved in the commitment, onset, and induction of apoptosis by the intrinsic pathway. The assays are built on magnetic beads to enable robust quantification of multiple proteins in cell and tissue lysates, and are available as premixed all-in-one kits.

Key features include:

- Analytically validated to standards set forth by the Clinical Laboratory Standards Institute (CLSI)
- Manufactured in accordance with GMP guidelines
- Lot-to-lot correlation specification of $R^2 \geq 0.9$ for consistently reproducible results
- 2-level quality controls with lot-specific ranges
- Assay quick guide to get you started right away
- Fastest available assay protocols and a convenient all-in-one kit format
- Magnetic beads for simplified plate processing



Available Bio-Plex Pro RBM Apoptosis Analytes

Panel 1	Panel 2	Panel 3
Bak	Bad	Active caspase-3
Bax	Bax / Bcl-2 dimer	Bcl-xL / Bak dimer
Lamin B	Bcl-xL	Mcl-1 / Bak dimer
Smac	Bim	Survivin
	Mcl-1	

Ordering Information

Catalog #	Description
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Bio-Plex Pro RBM Apoptosis Assays

171WAR1CK	Bio-Plex Pro RBM Apoptosis Panel 1 , 1 x 96-well all-in-one kit that includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, lysate dilution (LDB), cytosolic extraction (CEB), 10x assay), 10x streptavidin-PE, flat bottom plate, plate seals, and instructions, for the detection of the following analytes in cell and tissue lysates: Bak, Bax, Lamin B, and Smac
171WAR2CK	Bio-Plex Pro RBM Apoptosis Panel 2 , 1 x 96-well all-in-one kit that includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, lysate dilution (LDB), cytosolic extraction (CEB), 10x assay), 10x streptavidin-PE, flat bottom plate, plate seals, and instructions, for the detection of the following analytes in cell and tissue lysates: Bad, Bax / Bcl-2 dimer, Bcl-xL, Bim, and Mcl-1
171WAR3CK	Bio-Plex Pro RBM Apoptosis Panel 3 , 1 x 96-well all-in-one kit that includes premixed magnetic capture beads and detection antibodies, standards, 2-level controls, standard diluent, buffers (blocking, lysate dilution (LDB), cytosolic extraction (CEB), 10x assay), 10x streptavidin-PE, flat bottom plate, plate seals, and instructions, for the detection of the following analytes in cell and tissue lysates: active caspase-3, Bcl-xL / Bak dimer, Mcl-1 / Bak dimer, and survivin

Bio-Plex Pro RBM Kidney Toxicity Assays

Kidney Toxicity Assays

The Bio-Plex Pro RBM kidney toxicity assays, developed in partnership with Myriad RBM, comprise a highly relevant set of biomarkers for early detection and characterization of kidney toxicity/injury.

The assays are built on magnetic beads to enable robust quantification of multiple proteins in human, canine, and rat urine samples.

Key features include:

- Analytically validated to standards set forth by the Clinical Laboratory Standards Institute (CLSI)
- Manufactured in accordance with GMP guidelines
- Lot-to-lot correlation specification of $R^2 \geq 0.9$ for consistently reproducible results
- 2-level quality controls with lot-specific ranges
- Assay quick guide to get you started right away
- Fastest available assay protocols and a convenient all-in-one kit format
- Magnetic beads for simplified plate processing



Ordering Information

Catalog # Description

Bio-Plex Pro RBM Kidney Toxicity Assays

171ATR1CK	Bio-Plex Pro RBM Human Kidney Toxicity Panel 1 , 1 x 96-well, includes premixed magnetic capture beads, premixed detection antibodies, standards mix, 2-level controls, blocking buffer, standard diluent, sample dilution buffer, 10x assay buffer, 10x streptavidin-PE, 96-well flat bottom plate, plate seals, and instructions, for the detection of the following analytes: calbindin, clusterin, GST- π , IL-18, KIM-1, MCP-1
171ATR2CK	Bio-Plex Pro RBM Human Kidney Toxicity Panel 2 , 1 x 96-well, includes premixed magnetic capture beads, premixed detection antibodies, standards mix, 2-level controls, blocking buffer, standard diluent, sample dilution buffer, 10x assay buffer, 10x streptavidin-PE, 96-well flat bottom plate, plate seals, and instructions, for the detection of the following analytes: albumin, B2M, cystatin C, NGAL, osteopontin, TFF3
171KTR1CK	Bio-Plex Pro RBM Rat Kidney Toxicity Panel 1 , 1 x 96-well, includes premixed magnetic capture beads, premixed detection antibodies, standards mix, 2-level controls, blocking buffer, standard diluent, sample dilution buffer, 10x assay buffer, 10x streptavidin-PE, 96-well flat bottom plate, plate seals, and instructions, for the detection of the following analytes: clusterin, IL-18, KIM-1, MCP-1, osteopontin
171KTR2CK	Bio-Plex Pro RBM Rat Kidney Toxicity Panel 2 , 1 x 96-well, includes premixed magnetic capture beads, premixed detection antibodies, standards mix, 2-level controls, blocking buffer, standard diluent, sample dilution buffer, 10x assay buffer, 10x streptavidin-PE, 96-well flat bottom plate, plate seals, and instructions, for the detection of the following analytes: B2M, calbindin, cystatin C, NGAL
171KTR3CK	Bio-Plex Pro RBM Rat Kidney Toxicity Albumin Kit , 1 x 96-well, includes premixed magnetic capture beads, premixed detection antibodies, standards mix, 2-level controls, blocking buffer, standard diluent, sample dilution buffer, 10x assay buffer, 10x streptavidin-PE, 96-well flat bottom plate, plate seals, and instructions, for the detection of albumin

Bio-Plex Pro Diabetes Assays

Diabetes Assays

The Bio-Plex Pro diabetes assays are magnetic bead-based multiplex assays designed for enhanced assay sensitivity and assay working ranges. These assays detect human, non-human primate, mouse, and rat diabetes-related biomarkers using as little as 12.5 µl of sample per well.

Key features include:

- **Increased productivity** — measure up to 10 diabetes and obesity markers, plus adiponectin and adipsin, in only 3 hours
- **Expanded multiplexability** — mix diabetes assays with a host of compatible assays from our cytokine menu
- **Option to use a magnetic wash station** — simplify assay workflow and improve data consistency between experiments
- **Flexible ordering options** — order either premixed all-in-one kits or singleplex sets, or customize your assay with the Bio-Plex assay builder (bio-rad.com/assaybuilder)



- **Robustness** — performance tested in serum and plasma matrices
- **Cross-platform compatibility** — can be used with all xMAP life science instruments supplied by any Luminex partner

For More Information

Web: bio-rad.com/bio-plexprodiabetes

Download bulletin: 6119

Request or download bulletins: 6342

Available Bio-Plex Pro Diabetes Assays

Human (compatible with non-human primate samples)*	Mouse	Rat
Adiponectin	Adiponectin	Ghrelin
Adipsin	Ghrelin	GLP-1
C-Peptide	GIP	Glucagon
Ghrelin	GLP-1	Leptin
GIP	Glucagon	PAI-1
GLP-1	Insulin	
Glucagon	Leptin	
Insulin	PAI-1	
Leptin	Resistin	
PAI-1		
Resistin		
Visfatin		

* See instruction manual for details.

Ordering Information

Catalog # Description

Human Premixed All-in-One Kits (compatible with non-human primate samples)

171A7001M	Bio-Plex Pro Human Diabetes 10-Plex Panel , 1 x 96-well, includes premixed coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, standard and sample diluents for the detection of C-Peptide, ghrelin, GIP, GLP-1, glucagon, insulin, leptin, PAI-1, resistin, and visfatin
171A7002M	Bio-Plex Pro Human Diabetes Adipsin and Adiponectin Assays , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, serum-based diluent for the detection of adipsin and adiponectin
171A7003M	Bio-Plex Pro Human Diabetes Adiponectin Assay , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, serum-based diluent for the detection of adiponectin
171A7004M	Bio-Plex Pro Human Diabetes Adipsin Assay , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, flat bottom plate, sealing tape, serum-based diluent for the detection of adipsin

Bio-Plex Pro Human Diabetes Singleplex Sets, 1 x 96-Well*

171B7003M	C-Peptide Set	171B7008M	Insulin Set
171B7004M	Ghrelin Set	171B7009M	Leptin Set
171B7005M	GIP Set	171B7010M	PAI-1 Set
171B7006M	GLP-1 Set	171B7011M	Resistin Set
171B7007M	Glucagon Set	171B7012M	Visfatin Set

Standards

171D70001	Bio-Plex Pro Human Diabetes Standards , pkg of 1 vial, lyophilized mixture of 12 analytes
171D70050	Bio-Plex Pro Human Diabetes Standards , pkg of 50 lot-matched vials, lyophilized mixture of 12 analytes

Mouse Premixed All-in-One Kits

171F7001M	Bio-Plex Pro Mouse Diabetes 8-Plex Panel , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, standard and sample diluents for the detection of ghrelin, GIP, GLP-1, glucagon, insulin, leptin, PAI-1, and resistin
171F7002M	Bio-Plex Pro Mouse Diabetes Adiponectin Assay , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, assay and wash buffers, detection antibody diluent, streptavidin-PE, filter plate, flat bottom plate, sealing tape, serum-based diluent for the detection of adiponectin

Bio-Plex Pro Mouse Diabetes Singleplex Sets, 1 x 96-Well*

171G7002M	Ghrelin Set	171G7006M	Insulin Set
171G7003M	GIP Set	171G7007M	Leptin Set
171G7004M	GLP-1 Set	171G7008M	PAI-1 Set
171G7005M	Glucagon Set	171G7009M	Resistin Set

Standards

171I70001	Bio-Plex Pro Mouse Diabetes Standards , pkg of 1 vial, lyophilized mixture of 9 standard analytes, includes adiponectin, ghrelin, GIP, GLP-1, glucagon, insulin, leptin, PAI-1, and resistin
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Bio-Plex Pro Rat Diabetes Singleplex Sets, 1 x 96-Well*

171L7001M	Ghrelin Set	171L7006M	Leptin Set
171L7003M	GLP-1 Set	171L7007M	PAI-1 Set
171L7004M	Glucagon Set		

Standards

171NZ0001	Bio-Plex Pro Rat Standards , pkg of 1 vial, lyophilized mixture of 31 standard analytes. Compatible with rat cytokine and rat diabetes assays
-----------	--

Reagent Kit — for use with human diabetes singleplex sets

171304090M	Bio-Plex Pro Reagent Kit III , 1 x 96-well, includes detection antibody diluent HB, standard diluent HB, sample diluent HB, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods
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Reagent Kit — for use with rat and mouse singleplex sets

12002798	Bio-Plex Pro Reagent Kit V , 1 x 96-well, includes detection antibody diluent HP, standard diluent, sample diluent, assay buffer, concentrated wash buffer, streptavidin-PE, flat bottom plate, sealing tape, for magnetic separation methods
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* Includes coupled magnetic beads and detection antibody. Requires the appropriate reagent kit and standards. Singleplex sets should not be mixed with others from different panels or groups.

Bio-Plex Pro Human Isotyping Assays

Human Isotyping Assays

Bio-Plex Pro human isotyping assays are magnetic bead-based multiplex immunoassays offering accurate and reproducible measurements of multiple analytes simultaneously. These assays have been developed to provide reliable performance with the flexibility required to meet your research needs. They incorporate several features to enhance both quality and ease of use.

- **Magnetic beads** — simplified plate processing and improved reproducibility
- **Convenience** — all-in-one kit format for both multiplex and singleplex assays

Available Assays

IgG ₁	IgA
IgG ₂	IgM
IgG ₃	IgE
IgG ₄	IgG Total

- **1-level quality control**
- **Optimization** — one diluent optimized for use with samples, standards, and controls
- **Assay quick guide** — to get you started right away

For More Information

Web: bio-rad.com/isotyping

Request or download bulletin: 6344

Ordering Information

Catalog #	Description
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Bio-Plex Pro Human Isotyping Panel Premixed All-in-One Multiplex Kit

171A3100M	Bio-Plex Pro Human Isotyping Panel, 6-Plex , 1 x 96-well, includes coupled magnetic beads, detection antibodies, standards, 1-level quality controls, detection antibody diluent, isotyping diluent (for use with samples, standards, and controls), assay buffer, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, assay quick guide, and product data sheet, for detection of IgG ₁ , IgG ₂ , IgG ₃ , IgG ₄ , IgA, and IgM
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Bio-Plex Pro Human Isotyping All-in-One Singleplex Kits*

171A3101M	IgA Kit , 1 x 96-well
171A3104M	IgM Kit , 1 x 96-well
171A3102M	IgE Kit , 1 x 96-well
171A3103M	IgG Total Kit , 1 x 96-well

* Singleplex kits are specific for each assay indicated and include coupled magnetic beads, detection antibodies, standards, 1-level quality controls, detection antibody diluent, isotyping diluent (for use with samples, standards, and controls), assay buffer, wash buffer, streptavidin-PE, 96-well flat bottom plate, sealing tape, assay quick guide, and product data sheet.

Bio-Plex Pro Mouse Chemokine Panel

Mouse Chemokine Panel

The Bio-Plex Pro mouse chemokine panel is a ready-to-use, 1 x 96-well kit containing premixed magnetic capture beads and detection antibodies, standards, and buffers optimized to detect 33 biologically relevant mouse chemokines and cytokines in a single well. This assay delivers superior sensitivity and sample detection using minimal input sample volumes, thereby conserving precious mouse samples.

Benefits include:

- Sample efficiency — essential for mouse models
- Short protocol — results in 4 hours
- Flexible ordering options — order either premixed all-in-one kits or singleplex sets, or customize with your assay with the Bio-Plex assay builder (bio-rad.com/assaybuilder)

The Bio-Plex Pro mouse chemokine panel includes the following targets*:

BCA-1 / CXCL13	IL-2	MCP-5 / CCL12	TARC / CCL17
CTACK / CCL27	IL-4	MDC / CCL22	TECK / CCL25*
ENA-78 / CXCL5	IL-6	MIP-1 α / CCL3	TNF- α
Eotaxin / CCL11	IL-10	MIP-1 β / CCL4	
Eotaxin-2 / CCL24	IL-16	MIP-2 / CXCL2*	
Fractalkine / CX3CL1	IP-10 / CXCL10	MIP-3 α / CCL20	
GM-CSF	I-TAC / CXCL11	MIP-3 β / CCL19	
I-309/CCL1	KC / CXCL1	RANTES / CCL5	
IFN- γ	MCP-1 / CCL2	SCYB16 / CXCL16	
IL-1 β	MCP-3 / CCL7	SDF-1 α / CXCL12	

* MCP-2 / CCL8, MIP-2 / CXCL2, and TECK / CCL25 are available separately in single-plex format.

For More Information

Web: bio-rad.com/bio-plexmousechemokine

Ordering Information

Catalog #	Description
12009159	Bio-Plex Pro Mouse Chemokine 31-Plex , 1 x 96-well
12002247	Bio-Plex Pro Mouse Chemokine MCP-2/CCL8 Set , 1 x 96-well
12002254	Bio-Plex Pro Mouse Chemokine MIP-2 / CXCL2 Set , 1 x 96-well
12002260	Bio-Plex Pro Mouse Chemokine TECK / CCL25 Set , 1 x 96-well
12002798	Bio-Plex Pro Reagent Kit V , 1 x 96-well
12002796	Bio-Plex Pro Mouse Chemokine Standards , 1 pack

Bio-Plex Pro Human Apolipoprotein Assay Panel

Human Apolipoprotein Assay Panel

The Bio-Plex Pro human apolipoprotein panel is a sensitive, magnetic bead-based multiplex assay that allows the accurate measurement of ten apolipoproteins in diverse matrices, including serum and plasma. The multiplexing feature makes it possible to quantitate the level of multiple apolipoproteins in a single microplate well in just 3 hours, with a sample volume as low as 10 µl.

This panel is offered in a convenient, all-in-one, 10-plex kit format that includes assay, reagent, and buffers. Standard diluents for serum and plasma are included, along with two-level controls and lyophilized standards.

Benefits include:

- Robust performance, including lot-to-lot consistency data in each kit
- Fast assay protocol with short sample incubation times
- Easy collection and management of large datasets with Bio-Plex Manager and Bio-Plex Data Pro software, plus automated data optimization
- Reproducibility and simplified washing using a magnetic workflow

For More Information

Web: bio-rad.com/bio-plexapolipoprotein



Available Human Apolipoprotein Assay Panel Analytes

Apo-A1	Apo-E
Apo-A2	Apo-H
Apo-B	Clusterin / Apo-J
Apo-C1	C-reactive protein (CRP)
Apo-C3	
Apo-D	

Ordering Information

Catalog #	Description
12003081	Bio-Plex Pro Human Apolipoprotein Assay Panel, 10-Plex , 1 x 96-well, includes magnetic capture beads, detection antibodies, vial of standards, 2-level controls, diluents, buffers, streptavidin-PE, flat bottom plate, and plate seals, for the detection of 9 human apolipoproteins and CRP

Bio-Plex COOH Beads and Related Reagents

Bio-Plex Pro Magnetic COOH Beads

Carboxylated beads that enable you to build your own magnetic assays for use with either magnetic- or vacuum-based separation protocols during assay preparation. The magnetic beads are available in 20 bead regions in 1 ml vials for immediate delivery (4 ml vials are available with a 30-day lead time). The Bio-Plex amine coupling kit provides a complete set of reagents for coupling proteins to the beads. For nucleic acid coupling, refer to the instruction manual.

- Suitable for protein and nucleic acid multiplex assays
- Compatible with all Luminex xMAP readers, both Bio-Plex Pro and Bio-Plex Pro II wash stations, and Bio-Plex handheld magnetic washers

For More Information

Web: bio-rad.com/COOH



Ordering Information

Catalog #	Description
MC100xx01*	Bio-Plex Pro Magnetic COOH Beads, 1 ml
MC100xx04*	Bio-Plex Pro Magnetic COOH Beads, 4 ml

* xx = bead region. Bead regions available: 26–29, 34–37, 43–46, 52–55, and 62–65.

Bio-Plex Nonmagnetic COOH Beads

Develop your own Bio-Plex suspension array assays using these beads. The beads are internally labeled with two fluorescent dyes. Use the Bio-Plex amine coupling kit to attach nucleic acids, antibodies, or other proteins to polystyrene beads for multianalyte analysis of any sample in a 96-well format.

- **Flexible assays** — quickly add or remove analytes from your menu
- **Ready-to-use reagent kits** — optimized for Bio-Plex COOH beads
- **Complete solution** — one-stop source for all your assay needs
- **Compatibility** — works with 200 and 3D xMAP readers

For More Information

Web: bio-rad.com/COOH



Ordering Information

Catalog #	Description
1715060xx*	Bio-Plex Nonmagnetic COOH Beads, 1.25 x 10 ⁷ beads/ml, 1 ml
1716060xx*	Bio-Plex Nonmagnetic COOH Beads, 16 ml

* xx = bead region. Bead regions available, 11, 16, 18, 20, 24–28, 30, 31, 33, 35, 38, 42–46, 50–53, 56, and 66.

Bio-Plex Amine Coupling Kit

This kit was developed specifically for immobilizing antibodies or other proteins on Bio-Plex nonmagnetic COOH beads.

- Sufficient reagents for 30 coupling reactions using 100 μ l of Bio-Plex COOH beads
- Each coupling reaction supports the analysis of 200 samples
- Tested on proteins from 6–150 kD
- For use with antibodies or other proteins

For More Information

Web: bio-rad.com/COOH

Ordering Information

Catalog #	Description
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Bio-Plex Amine Coupling Kit

171406001*	Bio-Plex Amine Coupling Kit , 30 reactions, includes bead wash buffer, bead activation buffer, storage buffer, staining buffer, coupling reaction tubes
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Bio-Plex Streptavidin-PE

171304501	Bio-Plex Streptavidin-PE , streptavidin-phycoerythrin for 10 x 96-well reactions
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Note: Streptavidin-PE is a component of all reagent kits and is also available separately.

* For protein coupling only.

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Microplate Systems



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Microplate Absorbance Readers and Accessories

Instruments and Software

See Also

Protein assay kits:
page 20.

iMark Microplate Absorbance Reader

This reader offers a preprogrammed validation protocol and a built-in printer. The instrument can be used as a stand-alone reader or controlled by a PC or Mac with Microplate Manager 6 software, and comes with six standard absorbance filters: 415, 450, 490, 595, 655, and 750 nm. Five additional filters are available (405, 540, 550, 570, and 630 nm) as well custom filters at 5 nm intervals from 400–750 nm on request.



- Ability to read flat, U-, or V-bottom microplates or 8- or 12-well strip plates
- Automatic calibration before each reading
- Variable-speed plate-shaking capability
- Multilingual interface and LCD display (English, Japanese, Chinese, and Russian)

For More Information
 Web: bio-rad.com/iMark
 Request or download bulletin: 5670

Ordering Information

Catalog #	Description
1681130	iMark Microplate Absorbance Reader , 100/240 V, includes 6 filters (415, 450, 490, 595, 655, 750 nm), built-in plate shaker, onboard software and thermal printer, one roll printer paper, USB2 and power cables
1681135	iMark Microplate Absorbance Reader with Microplate Manager 6 Software , for PC and MAC
Accessories	
1660495	8-Channel Professional Adjustable-Volume 20–200 µl Digital Micropipet , pkg of 1, 8-channel 20–200 µl adjustable-volume micropipet, includes volume lock mechanism, curved tip ejector, rotating manifold, fully autoclavable
1686940	Checkmark Reader Performance Verification Kit , includes absorbance calibration plate, Checkmark software
1682230	IQ/OQ Kit for iMark Microplate Absorbance Reader , includes #1686940, IQ/OQ protocols

xMark Microplate Absorbance Spectrophotometer

With its monochromator design and spectral scanning feature (which eliminates the need for filters), this spectrophotometer can find the best wavelength within a broad range for any photometric application. The xMark spectrophotometer can read all standard microplates, from 6- to 1,536-well formats, and can perform a wide range of end-point and kinetic applications with spectral scanning within low UV to infrared wavelengths.



- Monochromator-based system for maximum optical efficiency and flexibility in photometry reading
- High-performance optics for low- or high-density formats
- Imaging capabilities for pixel intensity data in a single well or entire plate
- Includes Microplate Manager software
- Built-in plate shaker with variable mixing direction and adjustable speed and incubator with programmable temperature control

For More Information
 Web: bio-rad.com/xMark

Ordering Information

Catalog #	Description
1681150	xMark Microplate Absorbance Spectrophotometer , PC or Mac, built-in incubator, plate shaker, Microplate Manager 6 software, USB2 and power cables
1682000	Plate Adaptor , for using Terasaki plate with xMark microplate absorbance spectrophotometer

Accessories

1682250	IQ/OQ Kit for xMark Microplate Absorbance Spectrophotometer , includes #1686940, IQ/OQ protocols
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Microplate Manager 6 Software

Bio-Rad's iMark microplate reader and xMark microplate spectrophotometer can be utilized to their full potential with Microplate Manager 6 software. This comprehensive software package allows powerful, versatile colorimetric and turbidimetric analyses and report analysis for raw data, qualitative, and quantitative calculations based on absorbance limits, matrix of equations, normalization, and curve fit. Microplate Manager software expands your range

of data analysis options to include kinetics and screening, and adds the functionality of flexible template creation for any standard microplate format up to 1,536 wells and for 60- and 70-well Terasaki plates. The custom reporting function provides one-button screening for predefined assays such as those for TSE screening.

For More Information

Web: bio-rad.com/microplatemanager

Ordering Information

Catalog #	Description
1689520	Microplate Manager 6 Software , PC and Mac, for end-point and kinetic data analysis with iMark microplate absorbance reader and xMark microplate spectrophotometer

ImmunoWash 1575 Microplate Washer

The ImmunoWash 1575 microplate washer makes it easy to customize your plate-washing protocols. It offers complete control of needle position to perform special wash routines and maximize wash efficiency. This washer includes a wide choice of wash sequences to facilitate protocol creation and storage. It's compatible with strips and 96-well microplates that have flat, U-, or V-bottom wells.

- Programmable needle positions (horizontal and vertical) to an accuracy of 0.1 mm for bottom washing, crosswise aspiration, and overflow washing
- Dispensing speed control
- A plate-shaking option to help minimize bubbles and adherence of liquid to well sides



- Waste bottle sensor to detect high waste liquid levels
- Up to 75 programmable washing sequences

For More Information

Web: bio-rad.com/immunowash

Download bulletins: 2054 and 2135

Ordering Information

Catalog #	Description
1707009	ImmunoWash 1575 Microplate Washer , 110-240 V, includes bottle and tubing set, 8-port manifold, aerosol protection cover
1707021	ImmunoWash 1575 12-Channel Manifold
1707026	ImmunoWash 1575 Standard Maintenance Kit

ELISA Reagents and Kits

See Also

Blotting-grade conjugates: page 259.

ELISA Reagents

Enzyme-Antibody Conjugates

Bio-Rad offers enzyme-antibody conjugates and ELISA soluble substrate systems suitable for use in all microtitration enzyme immunoassays. Antibodies are available conjugated to HRP or AP enzymes.

Substrate Systems

The AP substrate kit contains *p*-nitrophenyl phosphate (pNPP) tablets and dilution buffer concentrate to prepare 500 ml of working solution. Benefits of the AP system include an extremely linear reaction rate and low background values for accurate quantitation by ELISA.

There are two convenient substrate systems for detection of HRP-labeled antibodies. Both the 2,2'-azino-di(3-ethylbenzothiazoline)-6-sulfonic acid (ABTS) peroxidase substrate kit and the 3,3',5,5'-tetramethylbenzidine (TMB) peroxidase substrate kit contain liquid reagents that are mixed just prior to use.

The single-component TMB peroxidase EIA substrate kit makes microplate assays convenient and fast.

For More Information

Web: bio-rad.com/microplatereagents

Ordering Information

Catalog #	Description
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Enzyme-Antibody Conjugates

1721011	Goat Anti-Mouse IgG (H + L)-HRP Conjugate, 2 ml
1721033	Goat Anti-Human IgG (γ)-HRP Conjugate, 1 ml
1721019	Goat Anti-Rabbit IgG (H + L)-HRP Conjugate, 1 ml
1721034	Rabbit Anti-Goat IgG (H + L)-HRP Conjugate, 1 ml
1721017	Rabbit Anti-Sheep IgG (H + L)-HRP Conjugate, 1 ml
1721037	Rabbit Anti-Goat IgG (H + L)-AP Conjugate, 1 ml

Substrate Systems

1721063	AP Substrate Kit, contains 100 pNPP tablets and 100 ml 5x concentrate diethanolamine buffer
1721064	HRP Substrate Kit, contains 180 ml ABTS, 20 ml hydrogen peroxide
1721066	TMB Peroxidase EIA Substrate Kit, contains 180 ml TMB solution, 20 ml hydrogen peroxide
1721067	TMB Peroxidase EIA Substrate Kit, contains 900 ml TMB solution, 100 ml hydrogen peroxide
1721068	Single-Component TMB Peroxidase EIA Substrate Kit, contains 100 ml TMB solution
1721072	Single-Component TMB Peroxidase ELISA Substrate Kit, contains 1 L TMB solution

Mouse Antibody Isotyping Kit

This kit provides a convenient ELISA method for identifying the class, subclass, and light-chain type of mouse IgGs in tissue culture supernatant and ascites fluid. The kit allows screening of up to 12 different antibody samples per plate. Each sample

is reacted with eight subclass-specific antisera to determine the heavy- and light-chain types of the monoclonal antibody.

For More Information

Web: bio-rad.com/microplatereagents

Ordering Information

Catalog #	Description
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1722051	Mouse Typer Isotyping Kit, includes mouse isotyping panel, affinity purified goat anti-rabbit IgG (H + L)
1722055	Mouse Typer Isotyping Panel, includes 10 ml each ultrapure rabbit anti-mouse subclass-specific antiserum to mouse IgG ₁ , IgG _{2a} , IgG _{2b} , IgG ₃ , IgM, IgA, κ-chain, and λ-chain

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Transfection

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Transfection Technologies

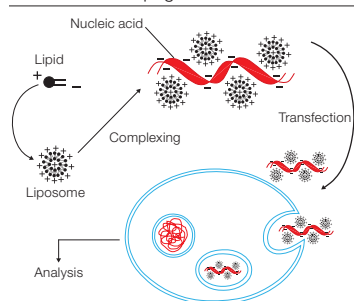
Introducing DNA and RNA into cells is a powerful tool for evaluating gene expression. Bio-Rad's transfection products offer choices for gene delivery to bacterial, fungal, plant, and animal cells. Use the guide below to select the most appropriate transfection technology for your application.

 [Learn More about the Technology](#)
 Web: bio-rad.com/tech/transfection

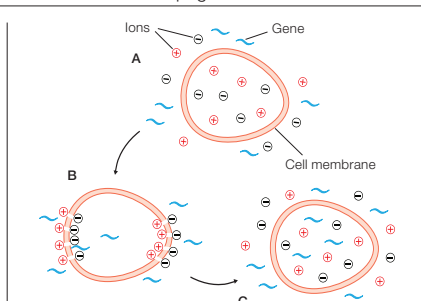
Transfection Technologies	Page	Plants										Bacteria		Fungi	Animals									
		Plant Cell Suspension Cultures	Plant Cell Adherent Cultures	Plant Cell Callus or Explants	Pollen	Leaves (in situ)	Detached Leaves	Meristems (in situ)	Detached Meristems	Gram-Positive Bacteria	Gram-Negative Bacteria	Yeast	Other Fungi	Skin or Organs (in vivo)	Organ Cultures	Ex Vivo Cells or Tissues (e.g., blood)	Suspension Cell Cultures	Mammalian Cells — Gene Knockdowns	Adherent Cells, Trypsinized	Adherent Cells, Attached	Organelles (chloroplasts, mitochondria)			
Lipid Transfection																								
siLentFect lipid reagent for RNAi	343														o	o	•	•	•	•	•			
TransFectin lipid reagent	344														o	o	•	•	•	•	•			
Electroporation																								
Gene Pulser Xcell total system	346	•*		•*		o		o	•	•	•	•					•	•	•	•				
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Biolistic Particle Delivery																								
Helios gene gun system	350	•	•	•	•	•	•	o	o	•	•	•	•	o	•	•			•	•	•			
PDS-1000/He system	351	•	•	•	•	•		•	o	o	•	•	•	•	o	•			•	•	•			
PDS-1000/He system with Hepta adaptor	352	•	•	•	•	•		•	o	o	•	•	•	•	o	•			•	•	•			

- First choice, highly recommended.
- Recommended, but other technologies may be better suited to that application.
- o Possible, but little data to support its effectiveness.
- * Protoplasts required.

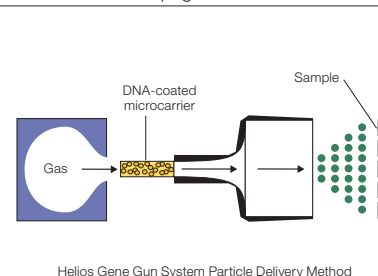
Lipid Transfection
page 343



Electroporation
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Biolistic Particle Delivery
page 349



Lipid Transfection Reagents

Lipid transfection is the process of using lipids to enable a cell to absorb DNA from outside itself. The liposome easily merges with the membrane of the cell since they are both composed of a phospholipid bilayer. Once the liposome and membrane are merged the genetic material can then be released inside the cell. Some familiar aliases for lipid transfection are lipid-mediated delivery, lipofection, and liposome-based gene transfection.

Lipid transfection has been shown to be successful in transfecting adherent and suspension cells and some primary cells (for example, mES and neuronal cells). Common applications employing lipid transfection include RNAi studies, protein production, viral production, gene function analysis, and cell-based assays.

Lipid Transfection Reagents Selection Guide

	siLentFect Lipid Reagent	TransFectin Lipid Reagent
Description	RNAi-specific lipid	General-purpose lipid
Applications	RNAi (siRNA delivery)*	Gene expression RNAi (siRNA/shRNA delivery)
Cell lines**	Variety of adherent and suspension cell lines, including A549, BHK, HeLa, K562, primary fibroblasts, and Vero	Variety of adherent and suspension cell lines, including A549, HeLa, HUVEC, MCF-7, and primary fibroblasts
Shelf life	6 months	6 months

* siLentFect can successfully cotransfect an siRNA molecule with a plasmid DNA.

** For a more complete list of cell lines, see below (siLentFect lipid reagent) and page 344 (TransFectin lipid reagent), or go to bio-rad.com/lipids.

siLentFect Lipid Reagent for RNAi

Effective Gene-Specific Silencing with Low Toxicity

siLentFect lipid reagent delivers siRNA to a broad variety of cultured mammalian cells for RNAi applications. RNAi is a powerful technique used for the specific inhibition of gene expression. An intrinsic cellular mechanism in most eukaryotes, RNAi helps regulate the expression of genes critical to cell fate determination, differentiation, survival, and defense from viral infection.

- **Effective gene-specific silencing** — achieve 90–99% gene-specific knockdown of both high- and low-abundance genes using as little as 1 nM siRNA for certain gene targets
- **Low amounts of siRNA and lipid required** — the high affinity of siLentFect lipid reagent for siRNA allows the use of less lipid and less siRNA per experiment, decreasing the likelihood of off-target effects, reducing cost, and minimizing the experimental bias caused by cell stress/death
- **Simple, flexible protocol** — easily adaptable protocol for high-throughput applications; successfully transfect cells by adding siLentFect reagent and siRNA directly to the culture or by adding siLentFect-siRNA complexes to trypsinized cells still in suspension
- **Cotransfection capabilities** — simultaneous delivery of siRNA and dsDNA vectors for optimization and dual expression analysis
- **Works with many cell types** — 184hrt, 4T1, A549, Caco-2, CHO-K1, COS-7, HEK 293, HeLa, HepG2, HUVEC, LNCaP, MCF-7, murine EC, NIH 3T3, PC-3, primary fibroblast, primary keratinocyte, primary ovarian, SVEC4, VSMC

For More Information

Web: bio-rad.com/silentfect

Download bulletins: 3105, 5439, and 5894



See Also

TC20 automated cell counter: page 28.

Experion automated electrophoresis system: page 277.

Supermixes for PCR and real-time PCR: page 388.

Real-time PCR systems: page 375.

Ordering Information

Catalog #	Description
1703360	siLentFect Lipid Reagent for RNAi, 0.5 ml
1703361	siLentFect Lipid Reagent for RNAi, 1.0 ml
1703362	siLentFect Lipid Reagent for RNAi, 5 x 1.0 ml

See Also

Supermixes for PCR and real-time PCR: page 388.

Real-time PCR systems: page 375.

Total RNA extraction kits: page 9.

Plasmid purification kits: page 13.

TransFectin Lipid Reagent

Efficient Delivery for High Gene Expression Levels

TransFectin lipid reagent delivers nucleic acids to a broad range of cell lines with high efficiency. Advantages of this reagent include:

- **Enables high-efficiency results** — effective transfection of both easy- and difficult-to-transfect cells
- **Minimally affects cell viability** — less cytotoxicity than other high-efficiency products makes it appropriate for sensitive cell lines; lower toxicity leads to healthier cells for post-transfection analysis
- **Simple to use** — part of an easy three-step protocol; dilute TransFectin reagent and nucleic acid in the appropriate medium, mix, incubate, and add to the cell culture. There is no need to change the medium for most cell types after addition of the complexes; just incubate and assay for expression
- **Allows flexibility in experimental conditions** — efficient transfection in both the presence and absence of serum-containing media; exceptional results are obtained when cells are transfected at densities between 40 and 90%



- **Affordable** — minimal amounts of TransFectin reagent are required for optimal transfection results compared to other reagents; using less lipid reduces the cost per transfection and reduces toxicity effects

For More Information

Web: bio-rad.com/transfectin

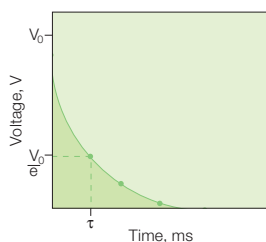
Download bulletins: 2873 and 3197

Ordering Information

Catalog #	Description
1703350	TransFectin Lipid Reagent, 0.5 ml
1703351	TransFectin Lipid Reagent, 1.0 ml
1703352	TransFectin Lipid Reagent, 5 x 1.0 ml

Electroporation Systems and Buffers

Electroporation is a powerful, highly efficient technique for introducing molecules (nucleic acids, proteins, carbohydrates, dyes) and viral particles into a wide variety of prokaryotic and eukaryotic cells. A high-intensity electric field transiently permeabilizes the membrane, enabling uptake of molecules from the surrounding



Exponential-decay pulse.

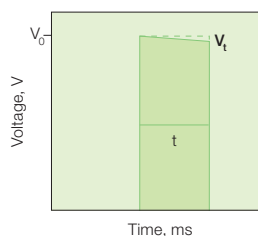
When a capacitor charged to a voltage V_0 is discharged into cells, the voltage applied to the cells decreases exponentially over time. The time required for the initial voltage to drop to V_0/e is referred to as the time constant (τ) and is a convenient expression of the pulse length.

medium. Electroporation provides a valuable and effective alternative to chemical, biological, and other physical methods of transfection.

For More Information

Web: bio-rad.com/electroporation

Online protocols: bio-rad.com/transfectionprotocols



Square-wave pulse.

Truncating the pulse from a capacitor after discharging it into the sample generates a square-wave pulse. The pulse length is the time the cells are subjected to the discharge. A slight drop in voltage occurs with all square-wave instruments. This drop in voltage is called the pulse droop and is measured as a percentage of the initial voltage.

A Choice of Exponential-Decay or Square-Wave Pulse

The Gene Pulser Xcell electroporation system generates both exponential and square waveforms, allowing you to choose the waveform and protocol that work best for your cells. Both exponential-decay and square-wave pulses

have been used effectively for electroporation. Depending on cell type, the shape of the wave can have a significant effect on the transfection efficiency. Electrofusion is also possible with the Gene Pulser system.

Electroporation Systems Selection Guide



Gene Pulser Xcell System
page 346



MicroPulser System
page 347

Plate-based system	No	No
Cuvette-based system	Yes	Yes
Eukaryotic or prokaryotic	Both	Prokaryotic
Recommended cells	Mammalian, bacterial, and fungal cell lines	Bacterial, yeast, and other microorganisms
Chamber	ShockPod chamber	ShockPod chamber
System options	Gene Pulser Xcell total system Gene Pulser Xcell eukaryotic system Gene Pulser Xcell microbial system	—

Gene Pulser Electroporation Buffer

The formulation of Gene Pulser electroporation buffer simulates the natural cell environment to minimize cell mortality while ensuring highly efficient delivery of nucleic acids. This electroporation buffer is a universal reagent for introducing siRNA, plasmid DNA, and other molecules into various mammalian cells, including difficult-to-transfect and primary cells. The buffer is compatible with electroporation systems, including Gene Pulser Xcell, Gene Pulser II, and most other systems. It is compatible with both exponential and square waveforms.

Gene Pulser electroporation buffer:

- Allows you to optimize multiple electroporation parameters, including voltage and capacitance, for each cell type
- Improves transfection efficiency and cell viability
- Exhibits low conductivity — compatible with cuvette or multiwell plate formats

For More Information

Web: bio-rad.com/electroporationbuffer

Download bulletin: 5582



Ordering Information

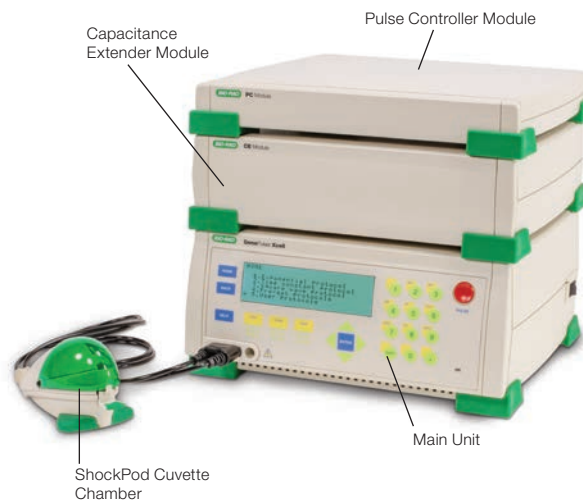
Catalog #	Description
1652676	Gene Pulser Electroporation Buffer , 10 x 1.8 ml
1652677	Gene Pulser Electroporation Buffer , 30 ml

Gene Pulser Xcell Electroporation Systems




The Gene Pulser Xcell system is a modular electroporation system for transfecting every cell type. The system includes a main unit, a ShockPod cuvette chamber, and your choice of accessory modules: the capacitance extender (CE module) or the pulse controller (PC module).

Features and Benefits

- **Universal electroporation** — transfects all cell types, from primary and stem cells to bacteria and yeast
- **Preset protocols** — include the most common mammalian and bacterial cell types
- **Flexibility** — choice of programs for preset protocols, optimization protocols, manual operation, or user protocols
- **Protocol library** — collection of electroporation protocols for every cell type including primary, immortal, and bacterial cells
- **Data management** — enables storage and recall of parameters used in the previous 100 experiments for easy troubleshooting
- **Reproducibility** — uses PulseTrac circuitry and arc protection to ensure reproducibility and sample protection



Gene Pulser Xcell System Selection Guide

System	Comments
Gene Pulser Xcell Total System 	The complete electroporation system for transfection of both eukaryotic and prokaryotic cells; includes both the CE and the PC modules.
Gene Pulser Xcell Eukaryotic System 	For the electroporation of most eukaryotic cells, including mammalian cells and plant protoplasts; includes the CE module.
Gene Pulser Xcell Microbial System 	For the electroporation of bacteria and fungi as well as other applications where high-voltage pulses are applied to samples of small volume; includes the PC module.

For More Information

Web: bio-rad.com/xcell

Download bulletin: 5445

Request or download bulletin: 5542

Ordering Information

Catalog #	Description
1652660	Gene Pulser Xcell Total System , for mammalian and microbial cells, 100/240 V, 50/60 Hz, exponential-decay and square-wave delivery, includes main unit, CE module, PC module, ShockPod cuvette chamber, 15 sterile cuvettes (5 each of 0.1, 0.2, and 0.4 cm gap), cuvette rack
1652661	Gene Pulser Xcell Eukaryotic System , 100/240 V, 50/60 Hz, exponential-decay (25–3,275 μ F range) and square-wave delivery, includes main unit, CE module, ShockPod cuvette chamber, 5 sterile cuvettes (0.4 cm gap), cuvette rack
1652662	Gene Pulser Xcell Microbial System , 100/240 V, 50/60 Hz, exponential-decay delivery, includes main unit, PC module, ShockPod cuvette chamber, 10 sterile cuvettes (5 each of 0.1 and 0.2 cm gap), cuvette rack

Components

1652666	Gene Pulser Xcell Main Unit , 100/240 V, 50/60 Hz
1652667	Gene Pulser Xcell CE Module , 25–3,275 μ F range controlled by main unit, includes integral leads
1652668	Gene Pulser Xcell PC Module , 50–1,000 Ω range controlled by main unit, includes integral leads
1652669	Gene Pulser Xcell ShockPod Cuvette Chamber , includes integral leads for connection to Gene Pulser Xcell, Gene Pulser II, or MicroPulser electroporators
1652095	Gene Pulser Cuvette Rack

MicroPulser Electroporator

The MicroPulser electroporator is a simple yet versatile instrument that enables safe and reproducible transformation of bacteria, yeast, and other microorganisms. Transformation efficiencies much higher than those obtained with chemical methods can be achieved. Unique features of the system include:

- One-button pulse delivery, attached cuvette chamber, and rapid charge time for fast sample handling
- Delivery of exponential waveform for prokaryotic cells
- Convenient preset optimized programs for commonly studied bacteria and fungi
- Arc quenching system that significantly reduces arcing, protecting against loss of valuable samples
- Broad range of parameters for manual optimization
- High-voltage (3,000 V) capability for improved efficiency in larger-volume cuvettes
- Compact, space-saving design
- Audible and visible pulse indicators
- Display of time constant and actual voltage delivered to monitor reproducibility

For More Information

Web: bio-rad.com/micropulser

Download bulletin: 2751

Request or download bulletin: 5542



MicroPulser electroporator with cuvette chamber attached. Electroporator is shown connected to the cuvette chamber.

Ordering Information

Catalog #	Description
1652100	MicroPulser Electroporator , includes a cuvette chamber with leads, 10 sterile cuvettes (5 each of 0.1 cm and 0.2 cm gap)

Gene Pulser/MicroPulser Electroporation Cuvettes

Bio-Rad offers high-quality electroporation cuvettes that deliver consistent pulses to your valuable samples, ensuring reproducible results. Cuvettes are available in three different gap widths: 0.4, 0.2, and 0.1 cm, for optimal field strength delivery to a wide range of cell types. Features of the cuvettes include:

- **Guaranteed efficiency** — manufactured to precise gap tolerances to ensure maximum electroporation efficiency and reproducibility between experiments
- **Universal compatibility** — can be used with Gene Pulser Xcell, Gene Pulser II, and most other electroporation systems
- **Ensured sterility** — each cuvette is assembled in a cleanroom environment, washed, fitted with a snug cap, individually wrapped, and sterilized by gamma irradiation
- **Sturdy construction** — durable polycarbonate withstands pulses of very high voltage
- **Color-coded caps and bags** — easy identification of different cuvette sizes
- **Consistent chamber shape** — seamless plastic molding eliminates leaking and keeps the aluminum plates parallel, which is essential for uniform sample treatment and safety
- **Smooth electrode surface** — the aluminum plates are subjected to an 11-step etching and cleaning process for uniform pulse delivery to the entire sample



For More Information

Web: bio-rad.com/electroporationcuvettes

Download bulletin: 1908

Request bulletin: 5542

Ordering Information

Catalog #	Description
Standard Packs	
1652088	Gene Pulser/MicroPulser Cuvettes, 0.4 cm gap, 50
1652086	Gene Pulser/MicroPulser Cuvettes, 0.2 cm gap, 50
1652089	Gene Pulser/MicroPulser Cuvettes, 0.1 cm gap, 50
Jumbo Packs*	
1652091	Gene Pulser/MicroPulser Cuvettes, 0.4 cm gap, 500
1652092	Gene Pulser/MicroPulser Cuvettes, 0.2 cm gap, 500
1652093	Gene Pulser/MicroPulser Cuvettes, 0.1 cm gap, 500
Mini Packs	
1652081	Gene Pulser/MicroPulser Cuvettes, 0.4 cm gap, 5
1652082	Gene Pulser/MicroPulser Cuvettes, 0.2 cm gap, 5
1652083	Gene Pulser/MicroPulser Cuvettes, 0.1 cm gap, 5

* Please inquire about volume pricing.

Biolistic Particle Delivery Systems

Biolistic technology, or particle bombardment, is a direct physical method of delivering nucleic acids into cells. The Helios gene gun and PDS-1000/He systems use advanced biolistic technology to transform cells in situ. This technology can be applied to the widest range of targets, including cell cultures, tissues, organs, plants, animals, and bacteria as well as organelles. The instruments use a helium pulse to accelerate high-density gold or tungsten particles coated with nucleic acids directly into target cells. Adjusting the pressure of the helium enables accurate penetration through the plant cell wall or cell membrane and into the cell.

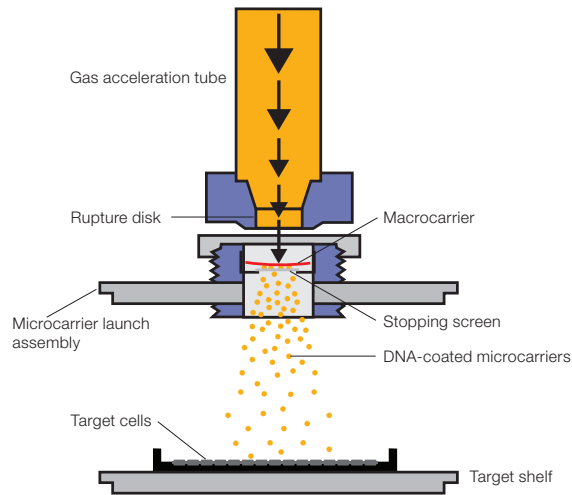
Particle Delivery Application Notes and Protocols

Bio-Rad offers detailed application notes and protocols describing biological and bombardment conditions for many applications. Visit us on the Web at bio-rad.com/biolistics to download application notes and protocols.

For More Information

Web: bio-rad.com/biolistics

Download bulletin: 5443



PDS-1000/He system particle delivery method. High-pressure helium is used to propel a macrocarrier sheet loaded with DNA-coated gold or tungsten microcarriers toward target cells. The macrocarrier is halted after a short distance and the DNA coated microcarriers continue traveling toward the target to penetrate the cells.

Biolistic Systems Selection Guide by Application

Factors Affecting Transformation	Helios Gene Gun System	PDS-1000/He System	PDS-1000/He System with Hepta Adaptor
Experimental conditions	In situ, in vitro, in vivo, ex vivo	In vitro, ex vivo, in vivo (plants)	In vitro, ex vivo, in vivo (plants)
Target area	Small (2 cm ²)	Large (40 cm ²)	Largest (~75 cm ²)
Pressure range	100–600 psi	450–2,200 psi	450–2,200 psi, reduced by 7-way spread of helium
Target type	Animals: Any tissue exposed to barrel (skin, organs); cell, explant, and organ culture Plants: Field and greenhouse use, plant cell culture, explants Yeast, bacteria, other microbes	Animals: Cell and organ culture Plants: Small intact plants, plant cell culture, explants Yeast, bacteria, other microbes Organelles (chloroplasts, mitochondria, etc.)	Animals: Cell and organ culture Plants: Cells with thin cell walls Yeast, bacteria, other microbes

Helios Gene Gun System

The Helios gene gun is a convenient handheld device that provides rapid and direct gene delivery to cells in situ. The unit uses an adjustable helium pulse to sweep DNA-, RNA-, or biomaterial-coated gold microcarriers from the inner wall of a small plastic cartridge directly into target cells. Cartridge “bullets” are simple to prepare using the tubing prep station.

- Provides easy-to-use, rapid, versatile gene delivery independent of target cell type
- Facilitates both transient and stable expression
- Requires only small amounts of DNA and cells; no carrier DNA needed
- Enables codelivery of more than one plasmid
- Allows transfer of large DNA fragments
- Targets intracellular gene delivery to many cells
- Works for both in vitro and in vivo transformation
- Delivers no extraneous genes or proteins
- Interactive CD-ROM (available separately; order the Particle Delivery Systems Training and Application Guide CD-ROM) guides all aspects of transfection using biolistic particle delivery technology



The Helios gene gun system includes one vial of each of the three sizes of gold microcarriers and a cartridge kit that includes 15 m (50') of Tefzel tubing, five cartridge collection/storage vials, five desiccant pellets, and 0.5 g of PVP for the sample tubing coating procedure. This is sufficient material (excluding nucleic acids, spermidine, CaCl₂, and absolute ethanol) for preparing approximately 1,000 gene gun samples.

For More Information

Web: bio-rad.com/helios

Download bulletins: 5443 and 5446

Ordering Information

Catalog #	Description
1652431*	Helios Gene Gun System, 100/120 V , includes Helios gene gun kit, helium hose assembly, helium regulator, tubing prep station, syringe kit, Tefzel tubing, tubing cutter, Helios gene gun optimization kit
1652432	Helios Gene Gun System, 220/240 V
1652451	Helios Gene Gun Low-Pressure System, 100/120 V , same as #1652431 with low-pressure regulator (maximum 400 psi)
1652452	Helios Gene Gun Low-Pressure System, 220/240 V

* Additional items required for operation of the Helios gene gun system: helium tank, grade 4.5 (99.995% pure) or higher, pressurized to the desired output pressure. Required items for tubing preparation: nitrogen tank, grade 4.8 (99.998% pure) or higher; nitrogen regulator (#1652425 recommended for U.S. standard connections); 100% ethanol (fresh for each microcarrier precipitation); spermidine; plasmid.

Accessories for Helios Gene Gun

Sample Preparation Accessories for Helios Gene Gun

Gold microcarriers, Tefzel tubing, cartridge collection/storage vials, and desiccant pellets are needed for Helios gene gun sample preparation. The gold microcarriers are available in 0.6, 1.0, and 1.6 μm diameters. Lengths of Tefzel tubing (up to 76 cm or 30") are coated with the DNA- or

RNA-microcarrier complexes using the tubing prep station. Coated tubing is cut into 1.25 cm (0.5") cartridges using the tubing cutter. Sample cartridges can be stored for later use at 4°C in cartridge collection/storage vials with a desiccant pellet. Additional barrel liners, cartridge holders, and other accessories are also available.

Ordering Information

Catalog #	Description
1652412	Helium Hose Assembly , with Swagelok quick-connect fittings
1652413	Helium Regulator , CGA 580 female fitting (U.S. standard), with pressure relief valve; maximum pressure 2,600 psi
1652414	Low-Pressure Helium Regulator for Helios Gene Gun , maximum pressure 400 psi
1652418	Tubing Prep Station , 100/120 V, includes tubing support cylinder, power cord, O-rings, tubing prep unit, 12' Nalgene nitrogen regulator hose, two 3/16" barb-to-male Luer-Lok fittings, nitrogen flowmeter fitting, two 1/8" barb-to-male Luer-Lok fittings, 5/64" hex wrench, 10 ml syringe holder
1652420	Tubing Prep Station , 220/240 V
1652421	Syringe Kit , includes syringe adaptor tubing (silicone, 5', 0.104" ID x 0.192" OD), five 10 ml syringes, syringe adaptor fitting, five 1/8" barb-to-female Luer-Lok fittings
1652422	Tubing Cutter , includes tubing cutter unit, 10 razor blades
1652424	Helios Gene Gun Optimization Kit , includes 0.25 g 0.6 µm gold microcarriers, 0.25 g 1.0 µm gold microcarriers, 0.25 g 1.6 µm gold microcarriers, cartridge kit
1652440	Cartridge Kit , contains 0.5 g PVP (MW 360,000), 5 cartridge collection/storage vials, 5 desiccant pellets, 50' Tefzel tubing
1652262	0.6 µm Gold Microcarriers , 0.25 g
1652263	1.0 µm Gold Microcarriers , 0.25 g
1652264	1.6 µm Gold Microcarriers , 0.25 g
1652425	Nitrogen Regulator for U.S. Standard Connections
1652416	O-Rings , 5
1652417	Barrel Liner , 5
1652426	Cartridge Holder , white, 5
1652435	Cartridge Extractor Tool , for removal of discharged cartridge
1652436	Battery , 9 V
1652441	Tefzel Tubing , 15 m (50')
1652475	Helios Diffusion Screens , 5
1652411	Helios Gene Gun Kit , 100/120 V, includes Helios gene gun, 5 O-rings, 5 barrel liners, 5 white cartridge holders, cartridge extractor tool, 9 V battery

PDS-1000/He and Hepta Systems

PDS-1000/He System

The PDS-1000/He system accelerates nucleic acid-coated gold or tungsten microparticles (0.6–1.6 µm) to velocities necessary to transfect cells, tissues, or organelles. The system uses a burst of high-pressure helium gas to accelerate a plastic macrocarrier disk carrying microparticles toward target cells. A stopping screen retains the macrocarrier while allowing the microparticles to penetrate the target cells. The PDS-1000/He system provides:

- A reproducible method for transfecting intact cells in culture, requiring little manipulation of cells
- Transfection of cells with unique growth requirements that are not amenable to other methods of gene transfer
- Interactive training and application guide (CD-ROM, available separately)



Hepta Adaptor

PDS-1000/He System

PDS-1000/He System with Hepta Adaptor

The Hepta adaptor, which fits into the shocking chamber of the PDS-1000/He system, splits the helium shock wave over seven macrocarriers. By spreading the DNA-coated particles over a larger area, the system maximizes the number of cells transformed, increasing transfection efficiency by a factor of seven to ten. Pressure and particle velocity are reduced, making the system ideal for plants and cell cultures that require less forceful penetration.

Accessories for the PDS-1000/He and Hepta Systems

Accessories for the PDS-1000/He and Hepta systems include:

- Rupture disks of various strengths to control the force of the helium shock wave

- Gold particles (microcarriers) of various diameters
- Macrocarriers
- Stopping screens
- Optimization kit to help fine-tune the bombardment conditions for your cells of interest. The kit contains samples of the gold microcarriers and 7 rupture disks, stopping screens, and macrocarriers for 500 bombardments
- Not provided: helium tank, grade 4.5 (99.995% pure) or higher, pressurized to 2,600 psi; vacuum source

For More Information

Web: bio-rad.com/pds1000

Download bulletins: [5443](#) and [5447](#)

Ordering Information

Catalog #	Description
1652257*	PDS-1000/He System , includes helium pressure regulator, solenoid, spacer rods, microcarrier launch assembly, target shelf, 5 macrocarrier holders, tubing
1652258*	PDS-1000/He Hepta System , includes PDS-1000/He system, Hepta adaptor
1652225	Hepta Adaptor for PDS-1000/He System , includes 5 stopping screens
1652259	Voltage Converter , for 220/240 V line voltage
Accessories	
1652278	500 Optimization Kit , includes 0.25 g each of 0.6, 1.0, and 1.6 µm gold microcarriers, 100 each of 7 rupture disks, 500 macrocarriers, 500 stopping screens
1652335	Macrocarriers , 500
1652322	Macrocarrier Holders , 5
1652326	450 psi Rupture Disks , 100
1652327	650 psi Rupture Disks , 100
1652328	900 psi Rupture Disks , 100
1652329	1,100 psi Rupture Disks , 100
1652330	1,350 psi Rupture Disks , 100
1652331	1,550 psi Rupture Disks , 100
1652332	1,800 psi Rupture Disks , 100
1652336	Stopping Screens , 500
1652226	Hepta Stopping Screens , 50
1652262	0.6 µm Gold Microcarriers , 0.25 g
1652263	1.0 µm Gold Microcarriers , 0.25 g
1652264	1.6 µm Gold Microcarriers , 0.25 g

* Additional items required for operation of the PDS-1000/He system: helium tank, grade 4.5 (99.995% pure) or higher, pressurized to 2,600 psi; vacuum source.

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Digital PCR

Droplet Digital PCR Systems

Several areas of research depend on the ability to study target DNA sequence variations. Digital PCR technology offers the ability to quantify molecular genetic changes. It is employed by researchers using numerous applications such as copy number variation, mutation detection, gene expression analysis, cell-free DNA quantification, genome edit detection, microRNA (miRNA) detection, genetically modified organism (GMO) quantification, biomarker discovery, and viral load quantification. Bio-Rad's QX ONE, QX200 AutoDG, and QX200 Droplet Digital PCR (ddPCR) systems, combined with our ddPCR supermixes, ddPCR assays and kits, and reliable thermal cyclers, offer researchers an easy-to-use, highly precise, and reproducible digital PCR package.

 [Learn More about the Technology](#)
 Web: bio-rad.com/tech/ddPCR

See Also

C1000 Touch thermal cycler: page 371.
 PX1 PCR plate sealer: page 407.

QX ONE Droplet Digital PCR System

The QX ONE Droplet Digital PCR (ddPCR) system expands upon the most proven digital PCR technology for unmatched precision and sensitivity in absolute quantification with advanced multiplex capabilities, high throughput, and fully integrated operation. The QX ONE ddPCR system takes care of droplet generation, thermal cycling, and reading so that you don't have to.

High Throughput

- Automated, walk-away operation
- Fully integrated instrument and consumable with droplet generation, cycling, and reading in a single plate
- Multiplate capacity, continuous operation with random access
- Onboard consumable monitoring and hot-swap capability

Advanced Multiplexing

- 4-color detection and analysis
- ddPCR multiplex supermix
- Software support for amplitude multiplexing, probe mixing, and drop-off assay strategies

Seamless Integration

- Compatible with existing Bio-Rad ddPCR supermixes, assays, and kits
- Probe chemistry is available
- Software is available in regulatory edition for U.S. FDA 21 CFR Part 11 compliant operation



Easy to Use

- Simple, intuitive setup
- Onboard touch screen
- Live data preview
- Radio frequency identification (RFID)-barcoded consumables
- Installation qualification (IQ), operational qualification (OQ), and performance qualification (PQ), for confidence in your system's precision and accuracy

For More Information

Web: bio-rad.com/digitalpcr

Ordering Information

Catalog # Description

QX ONE Droplet Digital PCR System

12006536 **QX ONE Droplet Digital PCR System**, fully integrated, 4-color, high-throughput Droplet Digital PCR platform
17005930 **QX ONE Droplet Digital PCR System with PX1 PCR Plate Sealer**, includes QX ONE Droplet Digital PCR instrument, touch screen, QX ONE accessory kit, and PX1 PCR plate sealer

Consumables and Accessories

12006057 **QX ONE Droplet Reader Oil**, for use with the QX ONE ddPCR system, enough for 10 ddPCR plates
12006058 **QX ONE Droplet Generation Oil for Probes**, for use with the QX ONE ddPCR system, enough for 18 ddPCR plates
12006858 **GCR96 Cartridge**, for use with QX ONE ddPCR system, 96 reactions
12006859 **GCR96 Cartridges**, for use with QX ONE ddPCR system, 96 reactions, pkg of 10
12006060 **QX ONE Droplet Reader Waste Bottle**, extra bottle for collection of system waste
12006843 **GCR96 Foil Heat Seal**, foil heat seal for GCR96 cartridge

QX200 Droplet Digital PCR Systems

The QX200 Droplet Digital PCR (ddPCR) system provides an absolute quantification of target DNA or RNA molecules with unmatched precision and sensitivity for digital PCR applications.

Benefits

- Most precise and sensitive digital PCR solution for a wide variety of applications
- Flexible digital PCR chemistry — optimized for TaqMan hydrolysis probes and EvaGreen® dye assays
- Flexible assay setup — scalable for high sensitivity or high throughput
- Simple and easy-to-use workflow with 96-sample throughput
- Droplet partitioning by the QX200 Droplet Digital technology reduces bias from amplification efficiency and PCR inhibitors
- Simplified quantification — standard curves are not required

Applications

- **Mutation detection** — superior sensitivity for detection of rare single nucleotide polymorphisms (SNPs), allelic variants, and circulating DNA in tissue and liquid biopsy samples
- **Copy number variation** — high precision and resolution to discriminate between small changes in copy number and distinguish changes in a complex background
- **Genome editing** — detection of rare genome editing events and distinction between homology-directed repair (HDR) and non-homologous end joining (NHEJ) DNA repair mechanisms
- **Pathogen detection** — quantification of low-abundance microorganisms in complex backgrounds, monitoring of microbial drug resistance, measurement of viral loads, and microbiome analysis

- **Gene expression analysis** — reliably measure low levels of mRNA and miRNA without using a standard curve
- **Next-generation sequencing (NGS)** — quantify NGS libraries without the use of standard curves; validate NGS results
- **Environmental** — popular for quality testing in a wide variety of environmental samples such as soil and water
- **Food testing** — validated method for routine evaluation of GMOs

The QX200 droplet generator partitions samples containing genomic DNA, cDNA, or RNA into ~20,000 nanoliter-sized droplets (8 samples/run). After PCR using a Bio-Rad thermal cycler, droplets from each sample are streamed in single file through the QX200 droplet reader. The PCR-positive and PCR-negative droplets are counted to provide absolute quantification of target DNA in digital form (96 samples/run).

Accessories

Droplet generation and reader oils, ddPCR reagents, droplet generator cartridges, and gaskets are used with the system.

Automated Droplet Generator

The automated droplet generator provides hands-free droplet generation for up to 96 samples quickly and reproducibly.

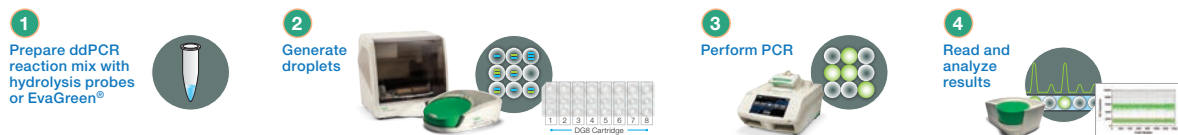
- Provides a high-throughput solution for digital PCR with the QX200 AutoDG ddPCR system
- Minimizes setup time
- Eliminates user-to-user variability
- Reduces contamination risk during droplet generation

Digital PCR

Droplet Digital PCR Systems

bio-rad.com/digitalpcr

Droplet Digital PCR Workflow



For More Information
Web: bio-rad.com/digitalpcr

Ordering Information

Catalog # Description

QX200 Droplet Digital PCR System

1864001	QX200 Droplet Digital PCR System , includes droplet generator, droplet reader, laptop computer, software, associated component consumables
1864100	QX200 AutoDG Droplet Digital PCR System , includes automated droplet generator, droplet reader, laptop computer
1864002	QX200 Droplet Generator , includes droplet generator, 1 box of 24 cartridges, 1 pkg of 24 gaskets, 2 cartridge holders, 1 power cord
1864101	Automated Droplet Generator , includes automated droplet generator, 1 power cord
1864003	QX200 Droplet Reader , includes droplet reader, 2 plate holders, 1 USB cable, 1 power cord

Consumables and Accessories for QX200 ddPCR System

1863004	ddPCR Droplet Reader Oil , 2 x 1 L bottles
1863005	Droplet Generation Oil for Probes , 10 x 7 ml bottles
1864008	DG8 Cartridges for QX200 Droplet Generator , 1 pkg of 24 cartridges
1863009	DG8 Gaskets for QX200 Droplet Generator , 1 pkg of 24 gaskets
1864007	Droplet Generator Cartridges and Gaskets , 5 pkg of 24 DG8 cartridges, 5 pkg of 24 DG8 gaskets
1863051	DG8 Cartridge Holder
12006834	Droplet Reader Plate Holder
12001925	ddPCR 96-Well Plates , pkg of 25, clear shell, clear well, semi-skirted plates, for use with QX200 and QX200 AutoDG Droplet Digital PCR systems
1864005	Droplet Generation Oil for EvaGreen , 2 x 7 ml bottles
1864006	Droplet Generation Oil for EvaGreen , 10 x 7 ml bottles

Consumables and Accessories for Automated Droplet Generator Only

1864108	DG32 Automated Droplet Generator Cartridges , 1 pkg of 30, enough for 10 x 96-well ddPCR plates
1864109	DG32 Automated Droplet Generator Cartridges , 1 pkg of 60, enough for 20 x 96-well ddPCR plates
1864110	Automated Droplet Generation Oil for Probes , 140 ml, enough for 20 x 96-well ddPCR plates
1864112	Automated Droplet Generation Oil for EvaGreen , 140 ml, enough for 20 x 96-well ddPCR plates
1864120	Pipet Tips for AutoDG System , 1 pkg of 20, enough for 10 x 96-well ddPCR plates
1864121	Pipet Tips for AutoDG System , 1 pkg of 40, enough for 20 x 96-well ddPCR plates
1864125	Pipet Tip Waste Bins for AutoDG System , 1 pkg of 10, enough for 10 x 96-well ddPCR plates

Droplet Digital PCR Reagents and Consumables

Bio-Rad offers PCR reagents for exclusive use with the Droplet Digital PCR (ddPCR) systems. These reagents include supermixes, consumables, and assays for a range of digital PCR applications.

ddPCR Supermix for Probes (No dUTP)

ddPCR supermix for probes (no dUTP) is a ready-to-use 2x supermix containing all components except primers and template. The supermix has been optimized to deliver maximum PCR efficiency, specificity, and sensitivity.

- Limits nonspecific PCR amplification
- Allows for DNA recovery after amplification
- Recommended for use with ddPCR assays

For More Information

Web: bio-rad.com/digitalpcr

Request or download bulletin: 6338



Ordering Information

Catalog #	Description
1863023	ddPCR Supermix for Probes (No dUTP) , 2 x 1 ml vials, 2x supermix, for use with QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR systems
1863024	ddPCR Supermix for Probes (No dUTP) , 5 x 1 ml vials, 2x supermix, for use with QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR systems
1863025	ddPCR Supermix for Probes (No dUTP) , 5 x 5 ml vials, 2x supermix, for use with QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR systems

ddPCR Multiplex Supermix

The ddPCR multiplex supermix is a 4x supermix specifically designed and optimized for multiplexing.

- Optimized for multiplex assays
- Allows for more sample input
- Limits nonspecific PCR amplification

For More Information

Web: bio-rad.com/digitalpcr

Ordering Information

Catalog #	Description
12005909	ddPCR Multiplex Supermix , 2 x 0.5 ml vials, 4x supermix, for use with QX200, QX200 AutoDG, and QX ONE ddPCR systems
12005910	ddPCR Multiplex Supermix , 5 x 0.5 ml vials, 4x supermix, for use with QX200, QX200 AutoDG, and QX ONE ddPCR systems
12005911	ddPCR Multiplex Supermix , 5 x 2.5 ml vials, 4x supermix, for use with QX200, QX200 AutoDG, and QX ONE ddPCR systems

ddPCR Supermix for Probes

ddPCR supermix for probes is a ready-to-use 2x supermix used to partition and amplify DNA for digital PCR. It is suitable for use with UNG decontamination protocols, which prevent the reamplification of carryover PCR products between experiments.

- Ensures precise target quantification
- Uses standard cycling protocols for probe-based simplex or duplex Droplet Digital PCR

For More Information

Web: bio-rad.com/digitalpcr

Request or download bulletin: 6338



Ordering Information

Catalog #	Description
1863026	ddPCR Supermix for Probes , 2 x 1 ml vials, 2x supermix, for use with QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR systems
1863010	ddPCR Supermix for Probes , 5 x 1 ml vials, 2x supermix, for use with QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR systems
1863027	ddPCR Supermix for Probes , 5 x 5 ml vials, 2x supermix, for use with QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR systems

ddPCR Supermix for Residual DNA Quantification

ddPCR supermix for residual DNA quantification is a 2x concentrated, ready-to-use digital PCR master mix optimized to deliver maximum PCR efficiency, specificity, and sensitivity for direct quantification of residual host cell DNA with the QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR (ddPCR) systems.

- No DNA purification required
- Free of detectable *Escherichia coli*, Chinese hamster ovary (CHO), mouse, human, and yeast DNA
- Contains all components required for hydrolysis probe-based ddPCR assays, except primers, probe(s), and template
- Limits nonspecific PCR amplification
- Includes hot-start polymerase to keep enzyme inactive during sample droplet partitioning
- Provides absolute quantification of residual host cell DNA, which is critical for environmental monitoring, food testing, etc



For More Information
Web: bio-rad.com/digitalpcr

See Also

C1000 Touch thermal cycler: page 371.
PX1 PCR plate sealer: page 407.

Ordering Information

Catalog #	Description
1864037	ddPCR Supermix for Residual DNA Quantification , 2 x 1 ml vials, 2x supermix, for use in residual DNA detection with the QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR systems
1864038	ddPCR Supermix for Residual DNA Quantification , 5 x 1 ml vials, 2x supermix, for use in residual DNA detection with the QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR systems
1864039	ddPCR Supermix for Residual DNA Quantification , 5 x 5 ml vials, 2x supermix, for use in residual DNA detection with the QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR systems

One-Step RT-ddPCR Advanced Kit for Probes

One-step RT-ddPCR advanced kit for probes is a reverse transcription digital PCR supermix delivering improved efficiency, specificity, and sensitivity for precise RNA target quantification. It contains thermostable enzymes that allow for RNA templates to be reverse transcribed and subsequently amplified in the same reaction tube.

- Optimized enzyme blend enables partitioning of RNA samples into droplets while keeping enzymes inactive until reverse transcription at 50°C
- Contains RNase inhibitor that protects the RNA throughout the workflow



For More Information
Web: bio-rad.com/digitalpcr
Download bulletin: 6250

Ordering Information

Catalog #	Description
1864021	One-Step RT-ddPCR Advanced Kit for Probes , 2 x 1 ml, 200 x 20 µl reactions, for use with QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR systems
1864022	One-Step RT-ddPCR Advanced Kit for Probes , 5 x 1 ml, 500 x 20 µl reactions, for use with QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR systems

QX200 ddPCR EvaGreen® Supermix

The QX200 ddPCR EvaGreen® supermix is a ready-to-use 2x supermix containing a dsDNA binding dye. The supermix supports dsDNA detection following amplification using commercially available primer assays.



- Recommended for use with Bio-Rad's ddPCR gene expression assays
- Compatible with QX200 and QX200 AutoDG Droplet Digital PCR systems

For More Information

Web: bio-rad.com/digitalpcr

Download bulletin: 6473

Ordering Information

Catalog #	Description
1864033	QX200 ddPCR EvaGreen Supermix , 2 x 1 ml vials, for use with QX200 and QX200 AutoDG Droplet Digital PCR systems
1864034	QX200 ddPCR EvaGreen Supermix , 5 x 1 ml vials , for use with QX200 and QX200 AutoDG Droplet Digital PCR systems
1864035	QX200 ddPCR EvaGreen Supermix , 5 x 5 ml vials , for use with QX200 and QX200 AutoDG Droplet Digital PCR systems

ddPCR 96-Well Plates

Designed and validated for Bio-Rad's Droplet Digital PCR workflow, ddPCR 96-well plates are for use with the QX200 and QX200 AutoDG Droplet Digital PCR systems. These 96-well semi-skirted PCR plates are optimized for maximum ddPCR performance.



- Compatible with the QX200 and QX200 AutoDG Droplet Digital PCR systems
- Compatible with the ddPCR residual DNA quantification workflow
- Free of detectable DNase and RNase
- Validated for use with pierceable foil heat seals and the PX1 PCR plate sealer

For More Information

Web: bio-rad.com/ddPCRplates

Download bulletin: 1000060943

Ordering Information

Catalog #	Description
12001925	ddPCR 96-Well Plates , pkg of 25, clear shell, clear well, semi-skirted plates, for use with QX200 and QX200 AutoDG Droplet Digital PCR systems

Droplet Digital PCR Assays and Kits

Droplet Digital PCR Assays

Bio-Rad offers a comprehensive assay portfolio for digital PCR, including:

ddPCR Gene Expression Assays

ddPCR gene expression assays enable accurate quantification with precision that enables <2-fold differences to be detected and are available in probe or EvaGreen® chemistry.

- For quantification of gene expression
- Ideal for detection of low expressing genes and samples that may contain PCR inhibitors
- Over 60,000 gene expression assays for human, rat, and mouse
- Available as FAM, HEX, or EvaGreen® assays
- Cy5 and Cy5.5 assays available for exclusive use with QX ONE Droplet Digital PCR system

ddPCR Mutation Detection Assays

ddPCR mutation detection assays offer superior sensitivity for detection of rare single nucleotide polymorphisms (SNPs) and allelic variants.

- Wet-lab validated assays are available for more than 200 targets
- Wet-lab validated assays are guaranteed to work when used as instructed
- Validation data are available online
- On-demand assay design is available for mutation detection assays through design portal, bio-rad.com/digital-assays
- Suitable for use with circulating tumor DNA, liquid biopsy, and formalin-fixed, paraffin-embedded (FFPE) and other tissue samples
- Orderable in convenient single-tube format (mutant and wild-type assays in a single tube)
- Positive control sequences provided
- Available in Cy5/Cy5.5 for exclusive use on the QX ONE Droplet Digital PCR system

ddPCR Copy Number Determination Assays

ddPCR copy number determination assays offer high precision and resolution to discriminate between small changes in copy number.

- Wet-lab validated assays are available for more than

700 targets

- Wet-lab validated centromeric reference assays are available for ~60 targets
- Validation data are available online
- On-demand assay design is available for copy number determination through design portal, bio-rad.com/digital-assays
- Orderable in FAM or HEX, and also in Cy5/Cy5.5 for use on the QX ONE Droplet Digital PCR system
- Reference assays available

ddPCR Genome Edit Detection Assays

ddPCR assays for detection of homology-directed repair (HDR) and non-homologous end joining (NHEJ) events in user-specified sequences allow rapid assessment of HDR and NHEJ edits generated by CRISPR-Cas9 or other genome editing tools.

- Detection of editing events present at frequencies $\leq 0.5\%$
- Absolute quantification of genome editing events from as little as 5 ng of total genomic DNA (cells from single well of a 96-well plate)
- Assays distinguish between homozygous and heterozygous edits in clonal populations
- Results are easily analyzable using Drop Off Analysis mode in the QuantaSoft Analysis Pro software

ddPCR Expert Design Assays

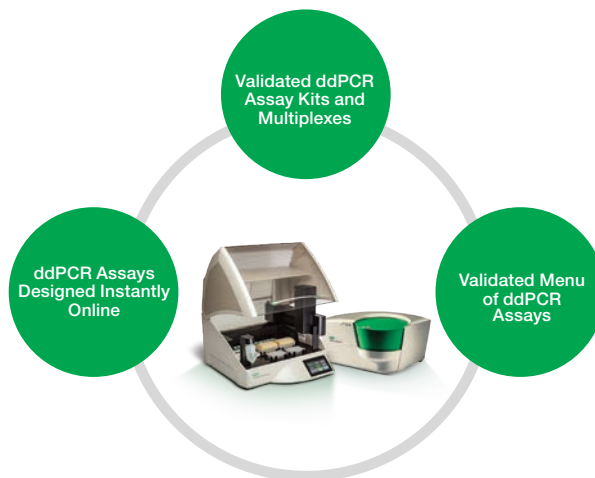
ddPCR expert design assays encompass a wide variety of applications, including assays for translocations, mutation detection, and multiplex mutation screening.

- Assays are available for *EML4-ALK* mRNA fusions, *RET* mRNA fusions, *ROS1* mRNA fusions, *TERT C228T* promoter mutation, *TERT C250T* promoter mutation, *ESR1* multiplex mutation detection, and more
- Orderable through bio-rad.com/digital-assays by searching for the unique assay ID corresponding to the expert design assay list on the bio-rad.com genomics site
- Validation is recommended prior to use

New assays are added regularly. Contact your Bio-Rad representative for updates.

For More Information

Web: bio-rad.com/digitalpcr
Request or download bulletin: 6512



The digital assay site allows users to find and buy mutation detection, copy number determination, and genome edit detection assays designed specifically for Droplet Digital PCR (ddPCR) for any target. The digital assay site can be accessed directly at bio-rad.com/digital-assays.

Simply submit your target and the site provides the best possible assay — a fully wet-lab validated assay where available, or a quick design by a digital PCR optimized engine. Built by the experts in digital PCR at Bio-Rad's Digital Biology Center, the engine takes into consideration everything from GC content and melting temperature to primer placement, probe length, and even genome specificity when designing an assay.

24/7 Self-Service

- Find, design, and buy an assay through **bio-rad.com** anytime
- Customizable assay name printed on the tube
- Positive control sequences provided for mutation detection assays

Getting Your ddPCR Assay Is as Easy as 1-2-3!

- Choose your application
- Enter target or sequence information
- Pick a size and add to your Bio-Rad cart

For More Information

Web: bio-rad.com/digitalassays

Request or download bulletin: 6901

ddPCR Residual DNA Quantification Kits

The amount of residual host cell DNA (HCD) present in biopharmaceutical products, such as biologics and vaccines, must meet guidelines established by regulatory agencies, including the World Health Organization, the European Pharmacopoeia, and the U.S. Food and Drug Administration, to ensure product quality and safety. The ddPCR CHO and *E. coli* residual DNA quantification (RDQ) kits allow highly sensitive and precise detection of residual host cell DNA directly from various complex sample matrices, eliminating the need for DNA extraction.

- Direct sample input
- Highly sensitive, precise detection and quantification of HCD without a standard curve
- Minimal method development
- Accurate quantification even with highly fragmented DNA
- Fast, simple workflow
- High sample throughput

For More Information
 Web: bio-rad.com/digitalpcr
 Download bulletin: 6820



Ordering Information

Catalog #	Description
17000031	ddPCR CHO Residual DNA Quantification Kit , includes 20x CHO RDQ assay and 2x ddPCR supermix for residual DNA quantification
17000032	ddPCR <i>E. coli</i> Residual DNA Quantification Kit , includes 20x <i>E. coli</i> RDQ assay and 2x ddPCR supermix for residual DNA quantification

ddPCR Library Quantification Kit

The ddPCR library quantification kit is the optimal solution for quality control of NGS libraries. This kit has been experimentally validated to ensure optimal performance. The assay generates data plots that are rich with qualitative library information, a feature not available with other methodologies such as quantitative PCR. With absolute quantification, standard curves and size adjustment calculations are not necessary to obtain precise library quantitation. When paired with the QX200 or QX ONE Droplet Digital PCR system, this kit allows accurate quantification and provides a qualitative measure of the DNA library prior to sequencing on an Illumina® platform.

- Contains all the necessary components to create droplets and quantify NGS libraries
- Provides both quantitative and qualitative data (including adapter dimers and relative library size diversity)
- Enables more efficient and consistent loading and balancing of libraries for sequencing runs

For More Information
 Web: bio-rad.com/digitalpcr
 Request or download bulletin: 6402



Ordering Information

Catalog #	Description
1863040	ddPCR Library Quantification Kit for Illumina TruSeq , includes 1 vial of primers and probes at 20x concentration, 2x ddPCR supermix for probes (no dUTP)

ddPCR Multiplex Mutation Screening Kits

Droplet Digital PCR (ddPCR) multiplex mutation screening kits are designed for rapid screening of several key cancer mutations in a single reaction with high precision and sensitivity. These kits are ideal for use with FFPE samples, liquid biopsy, fresh/frozen tissue, and samples with low yield or inhibitory substances. The kits contain an optimized, validated ddPCR mutation screening multiplex assay and ddPCR supermix for probes (no dUTP).



- Screen multiple mutations in a single well
- Detect with high sensitivity (limit of detection $\leq 0.5\%$)
- Process numerous samples in a rapid, cost-effective manner
- Work with low amounts of input DNA without preamplification
- Use with Bio-Rad's QX200, QX200 AutoDG, and QX ONE Droplet Digital PCR systems

Note: For research use only.

Mutations Detected by ddPCR Multiplex Mutation Screening Kits

Catalog Number	ddPCR Multiplex Mutation Screening Kit*	Mutations Detected
12001037	<i>BRAF V600</i>	V600E, V600K, V600R
1863506	<i>KRAS G12/G13</i>	G12A, G12C, G12D, G12R, G12S, G12V, G13D
12001626	<i>KRAS Q61</i>	Q61H (183A>C), Q61H (183A>T), Q61K, Q61L, Q61R
12001094	<i>NRAS G12</i>	G12A, G12C, G12D, G12R, G12S, G12V
12001627	<i>NRAS G12/G13</i>	G12A, G12C, G12D, G12S, G12V, G13D, G13R, G13V
12001006	<i>NRAS Q61</i>	Q61H (183A>C), Q61H (183A>T), Q61K, Q61L, Q61R
12002392	<i>EGFR</i> exon 19 deletions	>15 <i>EGFR</i> exon 19 deletions

* Assays for each of the mutations detected by these kits can also be ordered individually. Each kit contains 20x ddPCR mutation screening multiplex assay (1 x 200 μ l) and 2x ddPCR supermix for probes (no dUTP) (2 x 1 ml).

For More Information

Web: bio-rad.com/digitalpcr

Request or download bulletin: 6782

Ordering Information

Catalog #	Description
12001037	ddPCR <i>BRAF V600</i> Screening Kit , includes 20x multiplex assay and 2x ddPCR supermix for probes (no dUTP)
1863506	ddPCR <i>KRAS G12/G13</i> Screening Kit , includes 20x multiplex assay and 2x ddPCR supermix for probes (no dUTP)
12001626	ddPCR <i>KRAS Q61</i> Screening Kit , includes 20x multiplex assay and 2x ddPCR supermix for probes (no dUTP)
12001094	ddPCR <i>NRAS G12</i> Screening Kit , includes 20x multiplex assay and 2x ddPCR supermix for probes (no dUTP)
12001627	ddPCR <i>NRAS G12/G13</i> Screening Kit , includes 20x multiplex assay and 2x ddPCR supermix for probes (no dUTP)
12001006	ddPCR <i>NRAS Q61</i> Screening Kit , includes 20x multiplex assay and 2x ddPCR supermix for probes (no dUTP)
12002392	ddPCR <i>EGFR</i> Exon 19 Deletions Screening Kit , includes 20x multiplex assay and 2x ddPCR supermix for probes (no dUTP)

ddPCR *SMN1* Copy Number Determination Kit

The ddPCR *SMN1* copy number determination kit can be used for copy number determination of the survival motor neuron 1 (*SMN1*) gene. It contains a duplex assay, ddPCR supermix for probes (no dUTP) and positive controls for 0, 1, and 2 copies of *SMN1*.

- Predesigned and wet-lab validated copy number assay
- Uniform cycling conditions
- Contains all the necessary components to create droplets and determine copy number of the *SMN1* target

For More Information

Web: bio-rad.com/digitalpcr

Download bulletin: 6630

**Ordering Information**

Catalog #	Description
1863500	ddPCR <i>SMN1</i> Copy Number Determination Kit , includes assay at 20x concentration, 2x ddPCR supermix for probes (no dUTP), and positive controls

ddPCR *SMN2* Copy Number Determination Kit

The ddPCR *SMN2* copy number determination kit can be used for copy number determination of the survival motor neuron 2 (*SMN2*) gene. It contains a duplex assay, ddPCR supermix for probes (no dUTP) and positive controls for 2, 3, and 4 copies of *SMN2*.

- Predesigned and wet-lab validated copy number assay
- Uniform cycling conditions
- Contains all the necessary components to create droplets and determine copy number of the *SMN2* target

For More Information

Web: bio-rad.com/digitalpcr

Download bulletin: 6631

**Ordering Information**

Catalog #	Description
1863503	ddPCR <i>SMN2</i> Copy Number Determination Kit , includes assay at 20x concentration, 2x ddPCR supermix for probes (no dUTP), and positive controls

Coming Soon ddPCR Mycoplasma Detection Kit

The Droplet Digital PCR mycoplasma detection kit is a highly robust assay to detect the presence of mycoplasma in cell lines that are prone to outbreaks of various mycoplasma infections. This simplified multiplex mycoplasma detection solution provides absolute quantification, eliminating the need for standard curves. This easy-to-use kit is the first

mycoplasma detection kit ever developed for digital PCR.

Benefits include:

- Sensitive and accurate detection of mycoplasma
- Detection of numerous mycoplasma species
- Reliable and reproducible results

ddSEQ Single-Cell Sequencing Solution

This platform brings Bio-Rad's Droplet Digital technology to single-cell gene expression studies. In partnership with Illumina®, the single-cell sequencing solution provides a comprehensive workflow for robust, flexible, and high-throughput single-cell analysis.

ddSEQ Single-Cell Isolator

Single-cell RNA sequencing (RNA-Seq) provides deep insight into cell function, disease progression, and identification of therapeutic targets in research. By profiling hundreds to tens of thousands of single cells, researchers can differentiate individual cells in heterogeneous populations. The ddSEQ single-cell isolator works with Illumina® Bio-Rad kits such as the SureCell® WTA 3' library prep kit. The technology utilizes disposable microfluidic cartridges to coencapsulate single cells and barcodes into subnanoliter droplets, where cell lysis and barcoding occur. RNA-Seq libraries are subsequently prepared and sequenced, and analysis is conducted via the single-cell analysis BaseSpace® app.

- Process hundreds to tens of thousands of cells per day
- Sensitive and unbiased characterization of transcriptional signatures



- Scalable solution to accommodate a wide range of experimental designs
- Agnostic to mammalian cell size, enabling unbiased profiling of diverse cell populations
- An end-to-end single-cell sequencing solution with simple yet powerful data analysis options

For More Information

Web: bio-rad.com/ddSEQtechnology

Request or download bulletin: 6855

Ordering Information

Catalog #	Description
12004336	ddSEQ Single-Cell Isolator , includes single-cell isolator and associated component consumables for single-cell next-generation sequencing (NGS) applications using Illumina Bio-Rad single-cell sequencing solution kits

New SureCell® ATAC-Seq Library Prep Kit

The SureCell ATAC-Seq library prep kit and ATAC-Seq analysis toolkit enable highly sensitive ATAC-Seq assay for genome-wide open chromatin sequencing at the single-cell level. They leverage the throughput capabilities of Bio-Rad's ddSEQ single-cell isolator to partition thousands of nuclei or cells, each into its own nanoliter-sized droplet.

- Greater than 65% and up to 95% cell capture efficiency
- Cell throughput range of as few as 400 or more than 4,000 cells/nuclei per sample
- Best sensitivity possible from the highest number of unique sequencing fragments (>20,000) that map to the nuclear genome and transcription start sites
- An easy-to-use yet powerful and efficient bioinformatics tool in a flexible pipeline
- Runs on the ddSEQ single-cell isolator
- Works with nuclei or whole cells



For More Information

Web: bio-rad.com/scatac-seq
Request or download w: 7167

Ordering Information

Catalog #	Description
17004620	SureCell ATAC-Seq Library Prep Kit , includes ddSEQ M cartridges (12009359), SureCell ATAC-Seq reagent box A (1200358), and SureCell ATAC-Seq reagent box B (12009357)
12009360	SureCell ATAC-Seq Index Kit , to be used as a part of the SureCell ATAC-Seq library prep kit

Thermal Cyclers for PCR

Instruments range from the compact T100 thermal cycler to the flexible 1000-series. Multiple modules and chassis provide options for low- to high-throughput capabilities.

 [Learn More about the Technology](#)
Web: bio-rad.com/tech/PCR

Thermal Cycler Selection Guide

Feature	C1000 Touch page 371	S1000 page 372	T100 page 374
Peltier-effect technology	•	•	•
Upgradable to real-time PCR	•		
Interchangeable sample blocks	•	•	
Number of wells	96, 96 deep, dual 48, or 384	96, 96 deep, dual 48, or 384	96
Gradient capability	•	•	•
Graphical user interface	•		•
Full-color display	•		•
Fast PCR protocol templates	•	•	•
Programmable ramp rates	•	•	•
Networking capability	•	•	
Heated lid	Adjustable	Adjustable	Fixed
USB flash drive compatibility	•		•

1000-Series Thermal Cyclers

Bio-Rad's 1000-series thermal cyclers offer a fully modular platform. Choose the full-featured C1000 Touch cycler, the S1000 cycler, or connect multiple S1000 cyclers to a C1000 Touch to easily run multiplate experiments. The cyclers can accommodate different throughput needs with easily interchangeable reaction blocks.



C1000 Touch
Thermal Cycler



T100 Thermal Cycler



S1000 Thermal Cycler

T100 Thermal Cycler

The T100 thermal cycler is a compact, 96-well thermal cycler that offers a comprehensive package of features, including an easy-to-use touch screen, thermal gradient, and reliable performance.

C1000 Touch Thermal Cycler

The C1000 Touch cycler is the flagship of the 1000-series thermal cycling platform, offering unmatched performance for fast, reliable results. The touch-screen interface allows ways to optimize protocols and monitor runs.

Benefits include:

- Easily upgrade to real-time PCR using the CFX96, CFX96 deep well, or CFX384 optical reaction module
- Save time creating and viewing protocols using the large color touch-screen display and intuitive graphical programming
- Email notification of run completion capability
- Back up your data and manage and transfer files using a USB flash drive
- Optional log-in, restricted user privileges, and secure mode for controlled environments and file protection



- Increase throughput simply and easily by connecting up to 3 S1000 cyclers to your C1000 Touch

For More Information

Web: bio-rad.com/C1000Touch

Request or download bulletins: 6085 and 6094

See Also

CFX96 Touch real-time PCR detection system: page 377.

CFX384 Touch real-time PCR detection system: page 379.

Ordering Information

Catalog #	Description
1841100	C1000 Touch Thermal Cycler Chassis , includes power cord; does not include reaction module
1851148	C1000 Touch Thermal Cycler with Dual 48/48 Fast Reaction Module , includes C1000 Touch thermal cycler chassis, dual 48/48 fast reaction module
1851196	C1000 Touch Thermal Cycler with 96-Well Fast Reaction Module , includes C1000 Touch thermal cycler chassis, 96-well fast reaction module
1851197	C1000 Touch Thermal Cycler with 96-Deep Well Reaction Module , includes C1000 Touch thermal cycler chassis, 96-deep well reaction module
1851138	C1000 Touch Thermal Cycler with 384-Well Reaction Module , includes C1000 Touch thermal cycler chassis, 384-well reaction module

S1000 Thermal Cycler

The S1000 thermal cycler can be used as a stand-alone, dependable instrument for PCR, or up to three S1000 cyclers can be connected to a C1000 Touch thermal cycler to form a high-throughput multi-bay instrument. The S1000 cycler offers the same thermal performance as the C1000 Touch cycler and lets you:

- Choose a reaction module that suits your needs — dual 48/48-well fast, 96-well fast, 96-deep well, or 384-well format
- Get optimal sealing using your favorite vessels and sealers with the redesigned, fully adjustable heated lid



For More Information

Web: bio-rad.com/S1000

Download bulletin: 6082

Request or download bulletin: 6094

Ordering Information

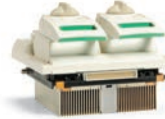
Catalog #	Description
1842000	S1000 Thermal Cycler Chassis , includes power cord; does not include reaction module
1852148	S1000 Thermal Cycler with Dual 48/48 Fast Reaction Module , includes S1000 thermal cycler chassis, dual 48/48 fast reaction module
1852196	S1000 Thermal Cycler with 96-Well Fast Reaction Module , includes S1000 thermal cycler chassis, 96-well fast reaction module
1852197	S1000 Thermal Cycler with 96-Deep Well Reaction Module , includes S1000 thermal cycler chassis, 96-deep well reaction module
1852138	S1000 Thermal Cycler with 384-Well Reaction Module , includes S1000 thermal cycler chassis, 384-well reaction module

Accessories

1848000	USB Cable , for use with C1000, C1000 Touch, and S1000 thermal cyclers
1849000	Tube Frame , supports individual 0.2 ml tubes in the C1000, C1000 Touch, and S1000 dual 48- and 96-well reaction modules
1849001	Tube Frame , supports individual 0.2 ml tubes in the C1000 Touch and S1000 96-deep well reaction module
1849010	Touch-Screen Protector , for use with C1000 Touch thermal cycler, 2
1841001	1000-Series Connectivity Kit , includes mouse, mouse pad, USB key

Reaction Modules

Reaction Module Specifications



Reaction Module	96-Well Fast	96-Deep Well	Dual 48/48-Well Fast	384-Well
Sample capacity	96 x 0.2 ml tubes or 1 x 96-well plate	96 x 0.2 ml tubes, 48 x 0.5 ml tubes, or 1 x 96-well plate	2 x 48 x 0.2 ml tubes or 2 x 48-well plates	1 x 384-well plate
Maximum ramp rate	5°C/sec	2.5°C/sec	4°C/sec	2.5°C/sec
Temperature range	0–100°C	0–100°C	0–100°C	0–100°C
Temperature accuracy	±0.2°C of programmed target at 90°C	±0.2°C of programmed target at 90°C	±0.2°C of programmed target at 90°C	±0.2°C of programmed target at 90°C
Temperature uniformity	±0.4°C well-to-well within 10 sec of arrival at 90°C	±0.4°C well-to-well within 10 sec of arrival at 90°C	±0.4°C well-to-well within 10 sec of arrival at 90°C	±0.4°C well-to-well within 10 sec of arrival at 90°C

Thermal Gradient (available on all reaction modules)

Gradient range	30–100°C
Temperature differential range	1–24°C

Ordering Information

Catalog #	Description
1840148	Dual 48/48 Fast Reaction Module , independent dual 48-well reaction module, fits C1000, C1000 Touch, and S1000 thermal cyclers, gradient enabled
1840196	96-Well Fast Reaction Module , fits C1000, C1000 Touch, and S1000 thermal cyclers, gradient enabled
1840197	96-Deep Well Reaction Module , fits C1000, C1000 Touch, and S1000 thermal cyclers, gradient enabled
1840138	384-Well Reaction Module , fits C1000, C1000 Touch, and S1000 thermal cyclers, gradient enabled

See Also

PCR plastic consumables: page 408.

PCR and real-time PCR reagents: page 388.

Nucleic acid sample preparation: page 9.

T100 Thermal Cycler

The T100 thermal cycler is a compact, 96-well thermal cycler that offers a comprehensive package of features, including an easy-to-use touch screen, thermal gradient, and reliable performance.

With the T100 thermal cycler, you can:

- Save time programming with the intuitive touch screen
- Get superior results faster by optimizing your PCR assays in a single run using a thermal gradient
- Save valuable benchspace with the compact design
- Keep your protocols organized using personalized folders or a USB flash drive



For More Information

Web: bio-rad.com/T100

Request or download bulletin: 6065

Ordering Information

Catalog #	Description
1861096	T100 Thermal Cycler , includes 96-well thermal cycler, power cord, tube support ring
1862000	Tube Support Ring , extra tube support ring for use with individual tubes in the T100 thermal cycler, 2
1863000	Touch-Screen Protector , for use with T100 thermal cycler, 2

Recommended Consumables

1708890	iScript cDNA Synthesis Kit , 25 x 20 µl reactions, includes 5x iScript reaction mix, iScript reverse transcriptase, nuclease-free water
1708896	iScript Select cDNA Synthesis Kit , 25 x 20 µl reactions, includes 5x iScript reaction mix, iScript reverse transcriptase, oligo(dT), random primer mix, gene specific primer enhancer solution, nuclease-free water
1708870	iTaq DNA Polymerase , 250 U (5 U/µl), includes 10x PCR buffer, 50 mM MgCl ₂ solution
1725301	iProof High-Fidelity DNA Polymerase , 100 U (2 U/µl), includes 5x HF buffer, 5x GC buffer, 50 mM MgCl ₂ solution, DMSO
HSS9601	Hard-Shell High-Profile 96-Well Semi-Skirted PCR Plates , clear shell, clear well, 25
MLP9601	Multiplate High-Profile 96-Well Unskirted PCR Plates , clear, 25
MSB1001	Microseal 'B' Adhesive Seals , optically clear, 100
TBS1201	0.2 ml 12-Tube Strips without Caps , clear, 100
TCS1201	Domed 12-Cap Strips , for 0.2 ml PCR tubes and plates, clear, 200
TWI0201	0.2 ml PCR Tubes with Domed Caps , clear, 1,000

Real-Time PCR Systems

Bio-Rad's CFX Opus real-time PCR detection systems are integrated units, while our CFX Touch models are available as individual systems or as upgrades to Bio-Rad's C1000 Touch thermal cyclers. The detection systems' optical modules allow up to five-target sequence detection via fluorescence detection chemistry in a 96- or 384-well plate format.

All systems support integrated data analysis for PrimePCR disease and biological pathway panels as well as automated multiplate gene expression analysis, absolute quantification, copy number variation, and high resolution melt genotyping applications. See the selection guide below for comparative specifications.

 [Learn More about the Technology](https://www.bio-rad.com/tech/qpcr)
[Web: bio-rad.com/tech/qpcr](https://www.bio-rad.com/tech/qpcr)

Real-Time PCR System Selection Guide



Feature	CFX Opus 96	CFX Opus 384	CFX96 Touch	CFX96 Touch Deep Well	CFX384 Touch	CFX Connect
Base thermal cycler	Integrated	Integrated	C1000 Touch	C1000 Touch	C1000 Touch	CFX Connect
Sample capacity	96 wells	384 wells	96 wells	96 wells	384 wells	96 wells
Sample volume	Up to 50 µl	Up to 30 µl	Up to 50 µl	Up to 125 µl	Up to 30 µl	Up to 50 µl
Light source	6 filtered LEDs	5 filtered LEDs	6 filtered LEDs	6 filtered LEDs	5 filtered LEDs	3 filtered LEDs
Optical detection	Diodes paired to LEDs in shuttle	Diodes paired to LEDs in shuttle	Diodes paired to LEDs in shuttle	Diodes paired to LEDs in shuttle	Diodes paired to LEDs in shuttle	Diodes paired to LEDs in shuttle
Excitation range	450–684 nm	450–650 nm	450–684 nm	450–684 nm	450–650 nm	450–535 nm
Detection range*	515–730 nm	515–690 nm	515–730 nm	515–730 nm	515–690 nm	515–580 nm
Multiplex capability	Up to 5 targets	Up to 4 targets	Up to 5 targets	Up to 5 targets	Up to 4 targets	Up to 2 targets
FRET capability	•	•	•	•	•	•
Maximum ramp rate	5°C/sec	2.5°C/sec	5°C/sec	2.5°C/sec	2.5°C/sec	5°C/sec
Gradient capability	•	•	•	•	•	•
Gradient range	30–100°C	30–100°C	30–100°C	30–100°C	30–100°C	30–100°C
Maximum gradient span	24°C	24°C	24°C	24°C	24°C	24°C
CFX qualification plate	•	•	•	•	•	•

* Refer to system instruction manuals or bulletins 6093, 6096, and 6105 for information about useful detection ranges for specific dyes.

See Also

- Total RNA extraction kits: page 9.
- Experion automated electrophoresis system: page 277.
- PCR and real-time PCR reagents: page 388.
- PrimePCR assays and panels: page 386.
- PX1 PCR plate sealer: page 407.
- PCR plastic consumables: page 408.

New CFX Opus Real-Time PCR Systems

The CFX Opus systems are the next evolution in robust real-time PCR from your trusted expert genomics partner. The CFX Opus systems seamlessly integrate into your modern lab with improved data connectivity. An updated physical and digital user experience augments our proven shuttle optics and improved thermal performance. This is our first system to integrate with the BR.io cloud platform.

- Reaction block with Bio-Rad's best ever thermal uniformity
- New cloud and networked storage accessed directly from the instrument
- Improved lid mechanism for better clearance and automation
- Continues to work with all the features of our CFX Maestro control and analysis software
- 6 filtered LEDs for easy multiplexing and FRET testing



For More Information

Web: bio-rad.com/cfxopus

Request or download bulletins: 7279

Ordering Information

Catalog #	Description
12011319	CFX Opus 96 Real-Time PCR System , includes CFX Opus 96 system and communication cable. Order CFX Maestro software separately
17005940	CFX Opus 96 Real-Time PCR System with Starter Package , includes CFX Opus 96 system, CFX Maestro software, license for qbase+ software, communication cable, reagents, consumables
12011452	CFX Opus 384 Real-Time PCR System , includes CFX Opus 384 system and communication cable. Order CFX Maestro software separately
17005939	CFX Opus 384 Real-Time PCR System with Starter Package , includes CFX Opus 384 system, CFX Maestro software, license for qbase+ software, communication cable, reagents, consumables

CFX96 Touch Real-Time PCR Detection System

The CFX96 Touch real-time PCR detection system meets all your real-time PCR needs — whether you are running your first experiment or analyzing complex gene expression studies. With five-target detection, industry-leading stand-alone functionality, superior thermal cycler performance, and easy-to-use software, the CFX96 Touch system has been designed to advance your quantitative PCR (qPCR).

The CFX96 Touch real-time PCR detection system makes it easy to:

- Rapidly screen expression from a few to hundreds of genes with PrimePCR assay panels. Just drag and drop the run file to start runs with a single click
- Monitor amplification traces on the touch screen in real time. At run completion, automatically receive the data file for remote monitoring and data analysis
- Conserve your samples and reagents with true five-target multiplexing
- Conduct powerful statistical analysis and data visualization with CFX Maestro software
- Expand your qPCR throughput with a simple upgrade to the CFX384 optical reaction module
- Save time and reduce costs by optimizing assays in a single run using the thermal gradient



For More Information

Web: bio-rad.com/cfx96-pcr

Request or download bulletins: 6075, 6076, and 6093

Ordering Information

Catalog #	Description
1845096*	CFX96 Optical Reaction Module for Real-Time PCR Systems with Starter Package , for use with C1000 Touch thermal cycler chassis, includes CFX Maestro software, license for qbase+ software, communication cable, reagents, consumables
1845097*	CFX96 Optical Reaction Module for Real-Time PCR Systems , for use with C1000 Touch thermal cycler chassis, includes communication cable. Does not include CFX Maestro software. Please order separately
1855196	CFX96 Touch Real-Time PCR Detection System with Starter Package , includes C1000 Touch thermal cycler chassis, CFX96 optical reaction module, CFX Maestro software, license for qbase+ software, communication cable, reagents, consumables
1855195	CFX96 Touch Real-Time PCR Detection System , includes C1000 Touch thermal cycler chassis, CFX96 optical reaction module, communication cable. Does not include CFX Maestro software. Please order separately
12013758	CFX Maestro Software Version 2 , compatible with Windows 7 and 10, includes USB installation drive, video quick guides, PDF instruction manual, license for qbase+ software

Accessories

1845098	CFX Qualification Plate , 96-well format, for use with CFX96, CFX96 Touch, CFX96 Touch deep well, or CFX Connect system, includes 1 predispensed plate containing supermix, primer mix, nuclease-free water
TLS0801	Low-Profile 8-Tube Strips without Caps (0.2 ml) , clear, 120 strips (960 tubes)
TCS0803	Optical Flat 8-Cap Strips , for 0.2 ml PCR tubes and plates, ultraclear, 120
HSP9601	Hard-Shell Low-Profile 96-Well Skirted PCR Plates , white shell, clear well, 50
MSB1001	Microseal 'B' Adhesive Seals , optically clear, package of 100
1814000	PX1 PCR Plate Sealer , includes heat sealing instrument, 96-well/384-well plate support block, sealing frame, power cord
1814030	Optically Clear Heat Seal , package of 100

* Order to upgrade an existing C1000 or C1000 Touch thermal cycler.

CFX96 Touch Deep Well Real-Time PCR Detection System

The CFX96 Touch deep well real-time PCR detection system offers precise quantification and target discrimination for up to five targets in large reaction volumes. The system incorporates industry-leading technology to provide robust and reliable results.

The CFX96 Touch deep well real-time PCR detection system makes it easy to:

- Use reaction volumes up to 125 μ l
- Rapidly screen expression from a few to hundreds of genes with PrimePCR assay panels. Just drag and drop the run file to start runs with a single click
- Monitor amplification traces on the touch screen in real time. At run completion, automatically receive the data file for remote monitoring and data analysis
- Conserve your samples and reagents with true five-target multiplexing
- Conduct powerful statistical analysis and data visualization with CFX Maestro software
- Save time and reduce costs by optimizing assays in a single run using the thermal gradient



For More Information

Web: bio-rad.com/CFX96DeepWell

Download bulletins: 6238 and 6243

Ordering Information

Catalog #	Description
1844096*	CFX96 Deep Well Optical Reaction Module for Real-Time PCR Systems with Starter Package , for use with C1000 Touch thermal cycler chassis, includes CFX Maestro software, license for qbase+ software, communication cable, reagents, consumables
1844095*	CFX96 Deep Well Optical Reaction Module for Real-Time PCR Systems , for use with C1000 Touch thermal cycler chassis, includes communication cable. Does not include CFX Maestro software. Please order separately
1854096	CFX96 Touch Deep Well Real-Time PCR Detection System with Starter Package , includes C1000 Touch thermal cycler chassis, CFX96 deep well optical module, CFX Maestro software, license for qbase+ software, communication cable, reagents, consumables
1854095	CFX96 Touch Deep Well Real-Time PCR Detection System , includes C1000 Touch thermal cycler chassis, CFX96 deep well optical module, communication cable. Does not include CFX Maestro software. Please order separately
12013758	CFX Maestro Software Version 2 , compatible with Windows 7 and 10, includes USB installation drive, video quick guides, PDF instruction manual, license for qbase+ software

Accessories

1845098	CFX Qualification Plate , 96-well format, for use with CFX96, CFX96 Touch, CFX96 Touch deep well, or CFX Connect system, includes 1 predispensed plate containing supermix, primer mix, nuclease-free water
TLS0801	Low-Profile 8-Tube Strips without Caps (0.2 ml) , clear, 120 strips (960 tubes)
TCS0803	Optical Flat 8-Cap Strips , for 0.2 ml PCR tubes and plates, ultraclear, 120
HSP9601	Hard-Shell Low-Profile 96-Well Skirted PCR Plates , white shell, clear well, 50
MSB1001	Microseal 'B' Adhesive Seals , optically clear, package of 100
1814000	PX1 PCR Plate Sealer , includes heat sealing instrument, 96-well/384-well plate support block, sealing frame, power cord
1814030	Optically Clear Heat Seal , package of 100

* Order to upgrade an existing C1000 or C1000 Touch thermal cycler.

CFX384 Touch Real-Time PCR Detection System

The CFX384 Touch real-time PCR detection system brings flexibility and ease of use to researchers performing high-throughput real-time PCR in a 384-well format. With the ability to run without a computer, superior performance, and powerful yet easy-to-use software, the CFX384 Touch system has been designed to advance your qPCR.

The CFX384 Touch real-time PCR detection system makes it easy to:

- Rapidly screen expression of hundreds of genes with PrimePCR assay panels. Just drag and drop the run file to start runs with a single click
- Verify the performance of your CFX real-time PCR detection system using the CFX qualification plate, system test software, IQ/OQ, and automated data quality control
- Integrate a laboratory information management system (LIMS) using built-in LIMS file management
- Pair with the CFX automation system II to automate your high-throughput qPCR runs
- Conduct powerful statistical analysis and data visualization with CFX Maestro software
- Combine the CFX384 Touch system with good laboratory practice standards by using CFX Maestro software, Security Edition, which complies with U.S. FDA 21 CFR Part 11 regulations, for data collection and analysis



For More Information

Web: bio-rad.com/cfx384-pcr

Download bulletin: 6077

Request or download bulletins: 6072 and 6096

Ordering Information

Catalog #	Description
1845384*	CFX384 Optical Reaction Module for Real-Time PCR Systems with Starter Package , for use with C1000 Touch thermal cycler chassis, includes CFX Maestro software, license for qbase+ software, communication cable, reagents, consumables
1845385*	CFX384 Optical Reaction Module for Real-Time PCR Systems , for use with C1000 Touch thermal cycler chassis, includes communication cable. Does not include CFX Maestro software. Please order separately
1855484	CFX384 Touch Real-Time PCR Detection System with Starter Package , includes C1000 Touch thermal cycler chassis, CFX384 optical reaction module, CFX Maestro software, license for qbase+ software, communication cable, reagents, consumables
1855485	CFX384 Touch Real-Time PCR Detection System , includes C1000 Touch thermal cycler chassis, CFX384 optical reaction module, communication cable. Does not include CFX Maestro software. Please order separately
12013758	CFX Maestro Software Version 2 , compatible with Windows 7 and 10, includes USB installation drive, video quick guides, PDF instruction manual, license for qbase+ software

Accessories

1845099	CFX Qualification Plate , 384-well format, for use with CFX384 or CFX384 Touch system, includes 1 predispensed plate containing supermix, primer mix, nuclease-free water
HSP3805	Hard-Shell 384-Well Standard PCR Plates , clear shell, white well, 50
MSB1001	Microseal 'B' Adhesive Seals , optically clear, package of 100
1814000	PX1 PCR Plate Sealer , includes heat sealing instrument, 96-well/384-well plate support block, sealing frame, power cord
1814030	Optically Clear Heat Seal , package of 100

* Order to upgrade an existing C1000 or C1000 Touch thermal cycler.

CFX Connect Real-Time PCR Detection System

The CFX Connect real-time PCR detection system offers two-target analysis in a 96-well format. The system incorporates innovative optical technologies with long-lasting LEDs and solid-state components to provide maximum reliability and flexibility. Included with the system is the powerful, easy-to-use CFX Maestro software for system operation and data analysis.

- Save time and reduce costs by optimizing assays in a single run using the thermal gradient
- Quickly and accurately validate and analyze data with the advanced analysis modules of CFX Maestro software
- Analyze data when and where you want by receiving email notification with an attached data file when a run is complete
- Increase throughput and flexibility by running up to 4 instruments from 1 computer



For More Information

Web: bio-rad.com/cfxconnect

Download bulletin: 6102

Request or download bulletins: 6103 and 6105

Ordering Information

Catalog #	Description
1855200	CFX Connect Real-Time PCR Detection System with Starter Package , includes CFX Connect thermal cycler chassis, CFX Connect optical reaction module, CFX Maestro software, license for qbase+ software, communication cable, reagents, consumables
1855201	CFX Connect Real-Time PCR Detection System , includes CFX Connect thermal cycler chassis, CFX Connect optical reaction module, communication cable. Does not include CFX Maestro software. Please order separately
12013758	CFX Maestro Software Version 2 , compatible with Windows 7 and 10, includes USB installation drive, video quick guides, PDF instruction manual, license for qbase+ software

Accessories

1845098	CFX Qualification Plate , 96-well format, for use with CFX96, CFX96 Touch, CFX96 Touch Deep Well, or CFX Connect system, includes 1 predispensed plate containing supermix, primer mix, nuclease-free water
HSP9601	Hard-Shell Low-Profile 96-Well Skirted PCR Plates , white shell, clear well, 50
MSB1001	Microseal 'B' Adhesive Seals , optically clear, package of 100
1814000	PX1 PCR Plate Sealer , includes heat sealing instrument, 96-well/384-well plate support block, sealing frame, power cord
1814030	Optically Clear Heat Seal , package of 100

CFX Automation System II

The CFX automation system II is ideally suited to meet the high-throughput PCR requirements of today's drug discovery and screening workflows. It works with up to two CFX Touch real-time PCR detection systems to enable walk-away, high-throughput quantitative PCR (qPCR) operation. Each rack can hold up to forty-eight 384-well PCR plates or thirty-two 96-well plates, facilitating the generation of large volumes of data and rapid data analysis. The software is designed to work seamlessly with CFX Touch systems, eliminating the need for automation system expertise. Powerful software features enable the pairing of cycling information with specific barcoded plates and the direct importing of barcode information from laboratory information management systems (LIMS). The intuitive calibration wizard makes it simple to add CFX Touch systems at any point or recalibrate the automation system when required.

The CFX automation system II makes it easy to:

- **Save valuable laboratory space** — a single plate handler can service 2 CFX systems in a compact footprint
- **Meet changing throughput demands** — scalable design enables beginning with 1 CFX system and adding another CFX system when required
- **Stay organized** — track samples using the barcode reader and integrate with LIMS

For More Information

Web: bio-rad.com/automation

Request or download bulletins: 6626 and 6629



- **Save time** — seamless software integration with PrimePCR assays minimizes time-consuming setup and analysis
- **Analyze data when and where you want** — receive email notification with an attached data file at the completion of each run

See Also

PrimePCR assays and panels: page 386.
CFX qualification plate: page 382.

Ordering Information

Catalog #	Description
1845075	CFX Automation System II for Real-Time PCR Systems , includes plate handler and barcode scanner, mounting plate, automation software; does not include CFX real-time PCR detection system

CFX Automation System II Software 2.1

CFX automation system II software 2.1 is designed for customers using CFX real-time PCR detection systems with the CFX automation system II for high-throughput qPCR. This latest update will now:

- Support all barcode alphanumeric characters and many ASCII symbols in barcode 128, allowing customers to use plate barcodes with symbols and incorporate these into the run file name

For More Information

Web: bio-rad.com/automation

- Allow researchers to resize the barcode column in the Plate List Grid for better viewing of the entire barcode string
- Provide improvements to the automatic error recovery logic and calibration for better overall system performance

Real-Time PCR Instrument Validation Tool

Bio-Rad's real-time PCR instrument validation tool allows you to easily test the performance of your real-time PCR system.

Instrument Validation Tool



CFX Connect



**CFX96 Touch
CFX384 Touch
CFX96 Touch Deep Well**



**CFX Opus 96
CFX Opus 384**

CFX qualification plate	•	•	•
Software requirement	CFX Manager, version 3.1, or CFX Maestro	CFX Manager, version 3.1, or CFX Maestro	CFX Maestro, version 2.0 or higher

CFX Qualification Plate

The CFX qualification plate is an easy-to-use tool for validating the performance of your CFX system. The plate is predisposed with an optimized assay, supermix, and nuclease-free water. The CFX qualification plate can be incorporated into an instrument qualification procedure for easy tracking of your instrument's performance. Features include:

- 2-fold discrimination with 99.7% confidence level
- Predefined thermal cycling protocol and plate templates for a streamlined workflow
- Ability to generate a full PDF report with CFX Manager software 3.1 or CFX Maestro software



For More Information

Web: bio-rad.com/cfxqualification

Download bulletin: 6323

Ordering Information	
Catalog #	Description
1845098	CFX Qualification Plate , 96-well format, for use with CFX96, CFX96 Touch, CFX96 Touch deep well, or CFX Connect system, includes 1 predisposed plate containing supermix, primer mix, nuclease-free water
1845099	CFX Qualification Plate , 384-well format, for use with CFX384 or CFX384 Touch system, includes 1 predisposed plate containing supermix, primer mix, nuclease-free water

Real-Time PCR Software

Bio-Rad's real-time PCR software supports multi-instrument control and collection and analysis of real-time PCR data. Probe and primer design software enables rapid design of robust real-time PCR assays. Contact your representative if you need information about previous versions of software. For the latest software versions and the most up-to-date information, please visit the listed product web pages.

CFX Maestro Software Version 2

Go from quantification cycles (C_q) to statistically driven results with the latest CFX software. With just a few clicks, you can turn your carefully crafted plate setup into powerful studies with tools such as *t*-tests, clustergrams, volcano plots, and one-way analysis of variance (ANOVA). Then, prepare your results for publications and posters with highly customizable data visualization tools. With just one tool you can achieve the best quality data and publication-ready results. With CFX Maestro software you can:

- **Obtain statistics quickly and easily** — *t*-tests and 1-way ANOVA
- **Convert complex studies into clear results** — visualize the largest multiplate studies with single-window and box-and-whisker charts, scatter plots, clustergrams, volcano plots, and heat maps
- **Apply customizable and high-resolution graphics** — produce publication-ready graphics in just a few clicks
- **Integrate data with PrimePCR assays** — easily import PrimePCR plate maps and reference gene controls



CFX Maestro Software Minimum Requirements

Compatible real-time PCR system	All CFX systems
Operating system	Windows 7, Mac OS X El Capitan
Processor	1 GHz
RAM	1 GB (2 GB for Windows 7)
Hard drive space	10 GB
Screen resolution	1,024 x 768 with true-color mode
Drive	USB 2.0 Hi-Speed or above

For More Information

Web: bio-rad.com/cfx-maestro-software

Ordering Information

Catalog #	Description
12013758	CFX Maestro Software Version 2 , compatible with Windows 7 and 10, includes USB installation drive, video quick guides, PDF instruction manual, license for qbase+ software
12004128	CFX Maestro Software for Mac , compatible with Mac OS X El Capitan and macOS Sierra, includes USB installation drive, video quick guides, PDF instruction manual, license for qbase+ software; does not support instrument control

CFX Maestro Software, Security Edition

CFX Maestro software, Security Edition provides tools for U.S. FDA 21 CFR Part 11 compliance so that you can stay focused on building powerful, statistically significant studies. Security Edition uses a hardware protection key to encrypt files, track electronic signatures, and ensure that files cannot be opened or edited by other programs. Now, you can be certain that the integrity and validity of your data are preserved. With CFX Maestro software, Security Edition you can:

- **Get control where you need it** — password protect protocol and data files so that only the intended users have access
- **Benefit from fast and automatic tracking** — time- and date-stamped audit trails make tracking changes easy
- **Be standard operating procedure (SOP) ready** — assign user permissions and add electronic signatures to improve SOP traceability

CFX Maestro Software, Security Edition Minimum Requirements

Compatible real-time PCR system	All CFX Systems
Operating system	Windows 7
Processor	1 GHz
RAM	1 GB (2 GB for Windows 7)
Hard drive space	10 GB
Screen resolution	1,024 x 768 with true-color mode
Drive	USB 2.0 Hi-Speed or above

For More Information

Web: bio-rad.com/cfx-maestro-software-security-edition

Ordering Information

Catalog #	Description
1845001	CFX Maestro Software, Security Edition , includes 1 user license, USB installation drive, HASP HL key
1845005	CFX Maestro Software, Security Edition , includes 5 user licenses, 5 USB installation drives, 5 HASP HL keys

CFX Maestro Software, Chinese and Russian Editions

CFX Maestro software, Chinese and Russian Editions work with the regional settings of the Windows 7, 8, and 10 operating systems to provide localized, language-specific environments. The Chinese and Russian Editions also provide hardware protection to CFX Maestro software: a

HASP hardware license (HL)-based key must be attached to a USB port on the computer to use the software in regional language mode.

For More Information

Web: bio-rad.com/cfx-maestro-software-chinese-edition;
bio-rad.com/cfx-maestro-software-russian-edition

Ordering Information

Catalog #	Description
1845008	CFX Maestro Software, Chinese Edition , includes 3 user licenses, 3 USB installation drives, 3 HASP HL keys
1845028	CFX Maestro Software, Russian Edition , includes 3 user licenses, 3 USB installation drives, 3 HASP HL keys

Precision Melt Analysis Software

Precision Melt Analysis software imports and analyzes data files generated from the CFX96 Touch, CFX96 Touch Deep Well, CFX384 Touch, or CFX Connect real-time PCR detection systems to genotype samples based on the thermal denaturation properties of double-stranded DNA. The software can be used for a variety of genotyping applications, including scanning for new gene variants, screening DNA samples for SNPs, identifying insertions/deletions or other unknown mutations, and determining the percentage of methylated DNA in unknown samples. The software enables you to:

- Assign sample genotypes automatically, based on cluster analysis, or manually, using multiple data view options, to tailor the software to the appropriate analysis
- Generate a basic representation of the different clusters based on curve shifting (homozygotes) and curve shape change (heterozygotes) using the normalized melt curves plot feature

- Compare data between multiple file runs by combining them into a single melt study — develop a standard library of melt curve runs to analyze an unlimited number of melt experiments without having to export data
- View multiple displays of the data, including a simultaneous display of the original melt curves and the normalized plot
- Export data to multiple formats, including spreadsheet, image, XML, and HTML files
- Analyze multiple experiments from a single plate using the Well Groups feature
- Arrange melt data or melt study data into a customizable report

For More Information

Web: bio-rad.com/precision-melt-analysis-software
Download bulletin: 5798

Amplification Software Minimum System Requirements

Operating system	Windows 7
Processor	1 GHz
RAM	1 GB (2 GB for Windows 7)
Hard drive space	10 GB
Screen resolution	1,024 x 768 with true-color mode
Drive	USB 2.0 Hi-Speed or above

Ordering Information

Catalog #	Description
1845025	Precision Melt Analysis Software , includes 2 user licenses, installation CD, 2 HASP HL keys, melt calibration kit
1845015	Precision Melt Analysis Software Only , includes 2 user licenses, installation CD, 2 HASP HL keys
1845020	Melt Calibration Kit , includes melt calibration DNA standard, melt primers, precision melt supermix

See Also

iScript advanced
cDNA synthesis kit
for RT-qPCR:
page 402.

SsoAdvanced
universal SYBR®
Green supermix:
page 390.

SsoAdvanced universal
probes supermix:
page 391.

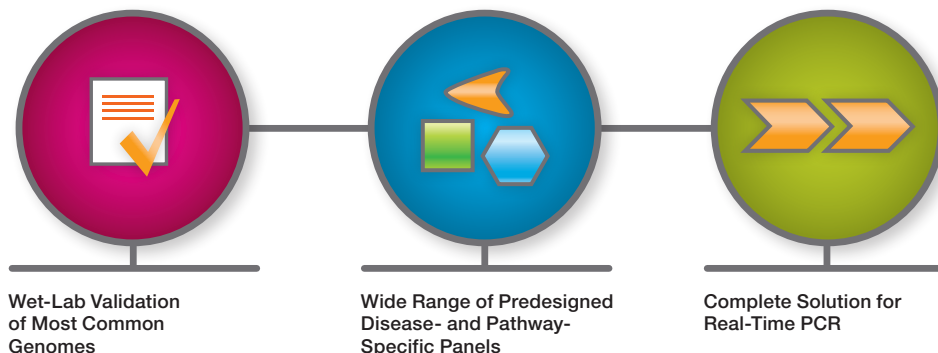
Gene Expression Assays and PCR Arrays

PrimePCR assays and arrays for real-time PCR are wet-lab validated or expertly designed to ensure optimal assay performance and compliance with the minimum information for publication of quantitative real-time PCR experiments (MIQE) guidelines (Bustin et al. 2009).

PrimePCR Assays and Panels

Wet-Lab Validated or Expertly Designed for Guaranteed Performance

Every mRNA gene expression assay for human, mouse, and rat has been wet-lab validated to meet stringent performance standards, providing confidence in results while eliminating time-consuming assay design and optimization. The assay design algorithm that was optimized during the wet-lab validation process has been used to expertly design assays for ten additional genomes that are guaranteed to perform.



Expert Design for All Assays

Design Parameter	Why It Matters
Maximum transcript coverage	Not detecting the maximum number of transcripts underrepresents expression of target
Intron-spanning assay design when possible	Genomic DNA amplification can lead to false-positive results, which is problematic when checking for small changes in gene expression
Secondary structure avoided	Secondary structure can impede polymerase activity and reduce PCR efficiency
Single nucleotide polymorphisms (SNPs) avoided	SNPs destabilize binding; mismatching results in reduced PCR efficiency, delayed shift in quantification cycle (C _q), and underestimation of gene expression
Specific sequences identified (specificity)	Coamplification of off-target sequences can cause high PCR efficiency and/or false-positive signals
Universal assay conditions tested	Assays work on any instrument with any protocol

Wet-Lab Validation for Human, Mouse, and Rat Assays

Design Parameter	Why It Matters
Specificity	Validation with next-generation sequencing and melt curve analysis prevents coamplification of off-target sequences that could cause high PCR efficiency and/or false-positive signals
Sensitivity/dynamic range	Not understanding the detection limits of the assay could lead to high PCR efficiency and/or false-positive signals
R ² value	Without a good R ² value, the C _q value will not be a reliable way to calculate the expression
Efficiency	High or low efficiency could cause misrepresentation of gene expression data

PrimePCR Genome and Product Summary

	Expertly Designed, Wet-Lab Validated Assays	
	Human, Mouse, and Rat	Expertly Designed Genomes Rhesus Monkey, Yeast, Zebrafish, Cow, Pig, Rabbit, Dog, Chicken, Rice, and <i>Arabidopsis</i>
SYBR® Green and probe assays	•	•
PreAmp assays	•	•
Pathway, collection, disease, and SABiosciences PCR arrays	•	
Custom plates	•	•
Control assays	•	•
Reference gene assays	•	•
Reference gene panels	•	

Wide Range of Pathway and Collection PCR Arrays

Pre-designed plates are available for signaling and disease pathways to help identify and investigate key targets in a biological pathway of interest. Pre-designed plates can be modified to include user-selected assays.

Customizable 96- and 384-Well Plate Formats

Easy-to-use custom plate configurator allows users to lay out assays on a plate exactly as they choose.

Fully Integrated with CFX Maestro Software

Full integration with CFX real-time PCR systems and data analysis software streamlines data collection and analysis.

The PrimePCR qPCR product family includes:

- **Pre-designed primer assays** — genome-wide assays for SYBR® Green gene expression analysis available in 200, 1,000, and 2,500 reaction sizes
- **Pre-designed probe assays** — genome-wide 5' nuclease probe assays in several reporter dye options for gene expression analysis available in 500, 1,000, and 2,500 reaction sizes
- **Custom assays** — order your primer and probe sequences of interest, available in 200, 500, 1,000, and 2,500 reaction sizes

- **Human long noncoding RNA (lncRNA) gene expression assays** — 20 pre-designed array plates and preamplification assay pools for streamlined discovery. Individual assays are available in both SYBR®- and probe-based formats for more than 14,000 lncRNA gene targets
- **Custom PCR plates** — custom-configured 96- and 384-well PCR plates
- **Pathway and collection PCR arrays** — pre-designed 96- and 384-well PCR pathway and collection panels
- **DNA templates** — synthetic DNA templates can be used as a positive control to trigger amplification for the corresponding gene-specific assay
- **Experimental controls** — control assays are available for reverse transcription, RNA quality, genomic DNA contamination, and PCR performance
- **Reference gene assays** — commonly used reference gene assays are available to normalize for variation in the amount of input mRNA among samples
- **PreAmp assays** — assays for the unbiased, target-specific preamplification of up to 100 gene targets in a single reaction

PrimePCR assays are also available for Droplet Digital PCR. Please see page 364 for more information.

For More Information

Web: bio-rad.com/primepcr

Download bulletins: 6262, 6263, and 6290



PCR and Real-Time PCR Reagents

Bio-Rad's PCR reagents and kits feature advanced enzyme technology and buffer formulations for reliable amplification, robust reverse transcription, and high-quality real-time PCR data.

Go to bio-rad.com/ReagentsSelector for the PCR and qPCR Reagents Selector.

Real-Time PCR Supermixes, Kits, and Assays

Real-time PCR supermixes are designed for superior qPCR performance under any condition, with any detection chemistry, and on any instrument.

For More Information

Web: bio-rad.com/supermixes

Request or download bulletin: 7178

Reagent Compatibility with Instruments

Real-Time qPCR Instrument	SYBR® Green qPCR Supermixes				Probes qPCR Supermixes			One-Step RT-qPCR Supermix and Kit		
	SsoAdvanced Universal SYBR® Green Supermix	iTaq Universal SYBR® Green Supermix	SsoAdvanced Universal Inhibitor-Tolerant SYBR® Green Supermix	iQ SYBR® Green Supermix	SsoAdvanced Universal Probes Supermix	iTaq Universal Probes Supermix	iQ Supermix and iQ Multiplex Powermix	Reliance One-Step Multiplex Supermix	iTaq Universal SYBR® Green One-Step Kit	iTaq Universal Probes One-Step Kit
Bio-Rad										
CFX96, CFX96 Touch, CFX384, CFX384 Touch, CFX Connect	•	•	•	•	•	•	•	•	•	•
iQ, iQ 5, MyiQ, MyiQ 2	•	•	•	•	•	•	•	•	•	•
MiniOpticon, DNA Engine Opticon 1 and 2	•	•	•	•	•	•	•	•	•	•
Applied Biosystems										
StepOne/StepOne Plus	•	•	•	◆	•	•	◆	•	•	•
7000, 7300, 7500, 7700, 7900HT, ViiA 7, QuantStudio (all systems)	•	•	•	—	•	•	—	•	•	•
Stratagene										
Mx3000P, 3005P, 4000	•	•	•	•	•	•	•	•	•	•
Eppendorf										
Mastercycler ep <i>realplex 2 or 4</i>	•	•	•	•	•	•	•	•	•	•
QIAGEN/Corbett										
Rotor-Gene 3000, 6000, Q	•	•	•	•	•	•	•	•	•	•
Roche										
LightCycler 480	•	•	•	•	•	•	•	•	•	•
LightCycler 96	•	•	•	•	•	•	•	•	•	•
LightCycler 1.0, 1.5, 2.0	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲
Illumina®										
Eco	•	•	•	•	•	•	•	•	•	•
Thermo Fisher Scientific										
PikoReal	•	•	•	•	•	•	•	•	•	•
Idaho Technology										
LightScanner HR-1	•	•	•	•	•	•	•	•	•	•
LightScanner 32	▲	▲	▲	▲	▲	▲	▲	▲	▲	▲

• Recommended for use as is; ◆ ROX reference setting must be turned "off"; ▲ BSA must be added according to instrument specifications

PCR and Real-Time PCR Reagents

Real-Time PCR Supermixes, Kits, and Assays

bio-rad.com/pcrreagents

Use this selection guide to choose the right product for your application.

Real-Time PCR Supermixes Selection Guide

Feature	Sso7d-Driven Superior Performance on Any Instrument	Advanced Formulation for Reliable and Universal Performance	Fast qPCR with EvaGreen®	Reliable and Trusted Performance
Product	SsoAdvanced Universal Supermixes	iTaq Universal Supermixes	SsoFast EvaGreen® Supermixes	iQ Supermixes
Available detection chemistry	SYBR® Green and probe	SYBR® Green and probe	EvaGreen®	SYBR® Green and probe
Sso7d fusion protein technology	Yes	No	Yes	No
Sensitive detection of low-abundance targets	Excellent	Excellent	Excellent	Good
Efficient amplification of difficult targets	Excellent	Good	Good	Good
Tolerance to PCR inhibitors	Excellent	Good	Good	Fair
Broad reaction conditions and assay compatibility*	Excellent	Good	Good	Fair
Polymerase activation (cDNA/gDNA)	30 sec/2 min	30 sec/2 min	30 sec/2 min	3 min
Fast cycling compatibility	Yes	Yes	Yes	Yes
Instrument compatibility	Both ROX-dependent (high and low) and ROX-independent	Both ROX-dependent (high and low) and ROX-independent	Select instruments	Select instruments

* Compatible with a broad range of primer concentrations, salt concentrations, annealing temperatures, and cycling protocols.

One-Step Reverse Transcription Quantitative PCR (RT-qPCR) Reagents Selection Guide

Features	Single-Tube, 4x Supermix for 5-Plex with 24-Hour Stability	Easy 2-Tube System for SYBR® Green and Probe-Based RT-qPCR
Product	Reliance one-step multiplex supermix	iTaq universal one-step kit
Available detection chemistry	Probes, multiplex up to 5 targets	SYBR® Green and probe duplex
Starting material	Purified RNA or DNA, lysate up to 10 µl	Purified RNA, lysate up to 4 µl
Product format	1 tube (4x RT-qPCR supermix)	2 tubes (reverse transcriptase + 2x qPCR supermix)
Detection sensitivity	High	High
Tolerance to PCR inhibitors	Great	Great
Assembled reaction stability	Up to 24 hours	—
Instrument compatibility	Both ROX-dependent (high and low) and ROX-independent	Both ROX-dependent (high and low) and ROX-independent

SsoAdvanced Universal SYBR® Green Supermix

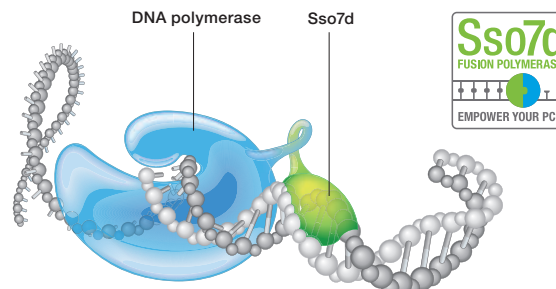
SsoAdvanced universal SYBR® Green supermix is an exclusive high-performance real-time PCR supermix based on Bio-Rad's patented* Sso7d fusion protein technology and advanced buffer formulation. This supermix is uniquely formulated to provide high processivity, increased PCR inhibitor tolerance, and robust performance with challenging templates and targets in SYBR® Green-based qPCR. It delivers superior performance for a wide range of applications on any qPCR platform and is validated to ensure optimal results with Bio-Rad's PrimePCR gene expression assays.

SsoAdvanced universal SYBR® Green supermix allows you to:

- **Achieve superior qPCR results under various experimental conditions** — for example, different primer concentrations, salt concentrations, annealing temperatures of various assays, and/or cycling protocols (standard or fast)
- **Increase your qPCR sensitivity and detection efficiency from compromised samples** — the highly processive Sso7d fusion polymerase has increased resistance to various PCR inhibitors, enhancing sensitivity and overall performance
- **Shorten time to results without compromising qPCR data quality** — the Sso7d fusion polymerase and optimized buffer provide rapid polymerization kinetics and instant polymerase activation
- **Use with any real-time PCR system** — the universal reference dye in this supermix enables ROX normalization of qPCR data regardless of the ROX level requirements of the qPCR system

Instrument Compatibility

The SsoAdvanced universal SYBR® Green supermix is compatible with all commercially available and all Bio-Rad real-time qPCR systems



The dsDNA binding protein, Sso7d, stabilizes the polymerase-template complex, increases processivity, and provides greater speed and reduced reaction times compared to traditional DNA polymerases. Sso7d fusion polymerases are significantly more resistant to PCR inhibitors, making the SsoAdvanced supermixes ideal choices for challenging applications, such as direct qPCR, without the need for sample preparation.

Applications and Uses of SsoAdvanced Universal SYBR® Green Supermix

- qPCR/real-time PCR
- Gene expression analysis
- Pathway analysis
- Absolute quantification
- Chromatin immunoprecipitation (ChIP) qPCR
- Mutation detection
- Pathogen detection
- Viral detection (load)
- Genetically modified organism (GMO) testing
- Genetic profiling

For More Information

Web: bio-rad.com/supermixes

View the [Understanding Real-Time PCR Supermixes Tutorial](http://bio-rad.com/supermixes_tutorial): bio-rad.com/supermixes_tutorial

Ordering Information

Catalog #	Description
1725270	SsoAdvanced Universal SYBR Green Supermix, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725271	SsoAdvanced Universal SYBR Green Supermix, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
1725272	SsoAdvanced Universal SYBR Green Supermix, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
1725274	SsoAdvanced Universal SYBR Green Supermix, 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
1725275	SsoAdvanced Universal SYBR Green Supermix, 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions

* U.S. patents 6,627,424; 7,541,170; and 7,560,260.

SsoAdvanced Universal Probes Supermix

SsoAdvanced universal probes supermix is an exclusive high-performance real-time PCR supermix based on Bio-Rad's patented* Sso7d fusion protein technology and advanced buffer formulation. This supermix is uniquely formulated to provide high processivity, increased PCR inhibitor tolerance, and robust performance with challenging templates and targets in probe-based qPCR. It delivers superior performance for a wide range of applications on any qPCR platform and is validated to ensure optimal results with Bio-Rad's PrimePCR gene expression assays.

SsoAdvanced universal probes supermix allows you to:

- **Carry out high-performance singleplex and duplex reactions** — the highly processive Sso7d fusion polymerase and advanced formulation enable robust performance in singleplex or duplex qPCR, allowing cost and time savings
- **Achieve superior qPCR results under various experimental conditions** — for example, different primer concentrations, salt concentrations, annealing temperatures of various assays, and/or cycling protocols (standard or fast)
- **Increase your qPCR sensitivity and detection efficiency from compromised samples** — the highly processive Sso7d fusion polymerase has increased resistance to various PCR inhibitors, enhancing sensitivity and overall performance
- **Shorten time to results without compromising qPCR data quality** — the Sso7d fusion polymerase and optimized buffer provide rapid polymerization kinetics and instant polymerase activation
- **Use with any real-time PCR system** — the universal reference dye in this supermix enables ROX normalization of qPCR data regardless of the ROX level requirements of the qPCR system



Applications and Uses of SsoAdvanced Universal Probes Supermix

- qPCR/real-time PCR
- Gene expression analysis
- Absolute quantification
- Genotyping (allelic discrimination)
- Mutation detection
- Pathogen detection
- Viral detection (load)
- GMO testing
- Genetic profiling

Instrument Compatibility

The SsoAdvanced universal probes supermix is compatible with all commercially available and all Bio-Rad real-time qPCR systems.

For More Information

Web: bio-rad.com/supermixes

View the [Understanding Real-Time PCR Supermixes Tutorial](http://bio-rad.com/supermixes_tutorial):
bio-rad.com/supermixes_tutorial

Ordering Information

Catalog #	Description
1725280	SsoAdvanced Universal Probes Supermix , 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725281	SsoAdvanced Universal Probes Supermix , 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
1725282	SsoAdvanced Universal Probes Supermix , 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
1725284	SsoAdvanced Universal Probes Supermix , 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
1725285	SsoAdvanced Universal Probes Supermix , 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions

* U.S. patents 6,627,424; 7,541,170; and 7,560,260.

SsoAdvanced Universal Inhibitor-Tolerant SYBR® Green Supermix

SsoAdvanced universal inhibitor-tolerant SYBR® Green supermix is an exclusive high-performance real-time PCR supermix based on Bio-Rad's patented* Sso7d fusion protein technology and advanced buffer formulation. This supermix is specifically formulated for SYBR® Green-based qPCR with challenging samples, including crude lysates and inhibitor-rich samples. This supermix delivers high processivity, unrivaled PCR inhibitor tolerance, and robust performance across a wide range of applications on any qPCR platform and is validated to ensure optimal results with Bio-Rad's PrimePCR gene expression assays.

SsoAdvanced universal inhibitor-tolerant SYBR® Green supermix allows you to:

- **Skip RNA and DNA extraction by using crude samples** — achieve superior data using crude lysates from plants, seeds, cells, bacteria, or formalin-fixed, paraffin-embedded (FFPE) samples
- **Power through PCR inhibitors** — delivers unrivaled performance with common PCR inhibitors such as heparin, polysaccharides, culture media, and more
- **Increase cDNA loading** — add up to 20% cDNA from our iScript advanced cDNA synthesis kit for RT-qPCR or iScript reverse transcription supermix for RT-qPCR
- **Obtain high-quality qPCR results under various experimental conditions** — for example, different primer concentrations, annealing temperatures, salt concentrations, and/or cycling protocols (standard or fast)



- **Shorten time to results without compromising qPCR data quality** — the Sso7d fusion polymerase and optimized buffer provide rapid polymerization kinetics and instant polymerase activation
- **Use with any real-time PCR system** — the universal reference dye in this supermix enables ROX normalization of qPCR data regardless of the ROX level requirements of the qPCR system

Applications and Uses of SsoAdvanced Universal Inhibitor-Tolerant SYBR® Green Supermix

- Viral and bacterial detection
- GMO testing
- Single nucleotide polymorphism (SNP) genotyping
- Mutation detection
- Environmental monitoring
- Gene expression
- Pathway analysis

Instrument Compatibility

The SsoAdvanced universal inhibitor-tolerant SYBR® Green supermix is compatible with all commercially available and all Bio-Rad real-time qPCR systems.

For More Information
Web: bio-rad.com/SUIT

Ordering Information

Catalog #	Description
1725016	SsoAdvanced Universal Inhibitor-Tolerant SYBR Green Supermix , 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725017	SsoAdvanced Universal Inhibitor-Tolerant SYBR Green Supermix , 5 ml (1 x 5 ml vial), 500 x 20 µl reactions
1725018	SsoAdvanced Universal Inhibitor-Tolerant SYBR Green Supermix , 10 ml (2 x 5 ml vials), 1,000 x 20 µl reactions

* U.S. patents 6,627,424; 7,541,170; and 7,560,260.

iTaq Universal Supermixes

iTaq universal supermix is a 2x concentrated, ready-to-use supermix formulated to deliver robust qPCR results with superior sensitivity, efficiency, and specificity. This supermix is available with SYBR® Green or probe-based chemistries.

Features and benefits include:

- Advanced buffer formulation developed for optimal qPCR results with SYBR® Green or fluorogenic probe (simplex and duplex)
- Antibody-mediated hot-start iTaq DNA polymerase for fast activation and superior specificity
- Optimized for consistent results using both standard and fast cycling protocols
- Blend of reference dyes for universal real-time PCR instrument compatibility



Instrument Compatibility

The iTaq universal SYBR® Green supermix and probes supermix are compatible with all commercially available and all Bio-Rad real-time qPCR systems.

For More Information

Web: bio-rad.com/supermixes

View the [Understanding Real-Time PCR Supermixes Tutorial](http://bio-rad.com/supermixes_tutorial): bio-rad.com/supermixes_tutorial

Ordering Information

Catalog #	Description
1725120	iTaq Universal SYBR Green Supermix, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725121	iTaq Universal SYBR Green Supermix, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
1725122	iTaq Universal SYBR Green Supermix, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
1725124	iTaq Universal SYBR Green Supermix, 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
1725125	iTaq Universal SYBR Green Supermix, 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions
1725130	iTaq Universal Probes Supermix, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725131	iTaq Universal Probes Supermix, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
1725132	iTaq Universal Probes Supermix, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
1725134	iTaq Universal Probes Supermix, 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
1725135	iTaq Universal Probes Supermix, 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions

SsoFast EvaGreen® Supermixes

SsoFast EvaGreen® Supermix

- Instant activation of antibody-mediated hot-start Sso7d fusion polymerase generates qPCR results in less than 30 min
- Sensitive amplification and detection from a single copy of a target gene
- Efficient discrimination and reliable quantification from 1.33-fold serial dilutions of template
- Minimal PCR inhibition of EvaGreen® and Sso7d polymerase generates greater fluorescent signals, resulting in increased sensitivity



PCR and Real-Time PCR Reagents

Real-Time PCR Supermixes, Kits, and Assays

bio-rad.com/pcrreagents

SsoFast EvaGreen® Supermix with Low ROX

- Instant activation of antibody-mediated hot-start Sso7d fusion polymerase generates qPCR results in approximately 40 min
- Preblended with ROX for optimal performance on Applied Biosystems standard and fast 7500 and ViiA 7 qPCR instruments
- Sensitive amplification and detection from a single copy of a target gene
- Minimal PCR inhibition of EvaGreen® and Sso7d polymerase generates greater fluorescent signals, resulting in increased sensitivity



Instrument Compatibility

The SsoFast EvaGreen® supermixes are compatible with select commercially available instruments and all Bio-Rad real-time qPCR systems.

For More Information

Web: bio-rad.com/supermixes

Ordering Information

Catalog #	Description
1725200	SsoFast EvaGreen Supermix, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725201	SsoFast EvaGreen Supermix, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
1725202	SsoFast EvaGreen Supermix, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
1725203	SsoFast EvaGreen Supermix, 20 ml (1 x 20 ml bottle), 2,000 x 20 µl reactions
1725204	SsoFast EvaGreen Supermix, 25 ml (5 x 5 ml vials), 2,500 x 20 µl reactions
1725205	SsoFast EvaGreen Supermix, 50 ml (10 x 5 ml vials), 5,000 x 20 µl reactions
1725210	SsoFast EvaGreen Supermix with Low ROX, 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725211	SsoFast EvaGreen Supermix with Low ROX, 5 ml (5 x 1 ml vials), 500 x 20 µl reactions
1725102	SsoFast EvaGreen Supermix with Low ROX, 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions
1725213	SsoFast EvaGreen Supermix with Low ROX, 20 ml (1 x 20 ml bottle), 2,000 x 20 µl reactions

iQ Supermixes

iQ SYBR® Green Supermix

- Formulated for efficient and sensitive SYBR® Green-based PCR in a wide variety of real-time PCR instruments
- Reliable detection of low-, medium-, and high-abundance target genes
- Antibody-mediated hot-start polymerase for quick activation and increased specificity

iQ Supermix

- Formulated for efficient and sensitive qPCR using fluorogenic probes in a wide variety of real-time PCR instruments
- Reliable quantification of up to 2 targets over a wide dynamic range of human genomic DNA and plasmid DNA concentrations
- Antibody-mediated hot-start iTaq DNA polymerase for quick activation and increased specificity

iQ Multiplex Powermix

- Robust supermix optimized for sensitive and efficient multiplex qPCR of up to 5 targets
- Reliable quantification of up to 4 targets when tone differs in expression up to 10⁶-fold relative to the others
- Linearity over 6 orders of magnitude of input cDNA and 4 orders of magnitude of input gDNA
- Suitable for a wide variety of applications, including gene expression analysis, SNP genotyping, SNP analysis, GMO detection, and viral load detection

For More Information

Request or download bulletin: 6090

Ordering Information

Catalog #	Description
1708880	iQ SYBR Green Supermix , 2.5 ml (2 x 1.25 ml vials), 100 x 50 µl reactions
1708882	iQ SYBR Green Supermix , 12.5 ml (10 x 1.25 ml vials), 500 x 50 µl reactions
1708884	iQ SYBR Green Supermix , 25 ml (20 x 1.25 ml vials), 1,000 x 50 µl reactions
1708885	iQ SYBR Green Supermix , 50 ml (50 ml bottle), 2,000 x 50 µl reactions
1708886	iQ SYBR Green Supermix , 25 ml (5 x 5 ml vials), 1,000 x 50 µl reactions
1708887	iQ SYBR Green Supermix , 50 ml (10 x 5 ml vials), 2,000 x 50 µl reactions
1708860	iQ Supermix , 2.5 ml (2 x 1.25 ml vials), 100 x 50 µl reactions
1708862	iQ Supermix , 12.5 ml (10 x 1.25 ml vials), 500 x 50 µl reactions
1708864	iQ Supermix , 25 ml (20 x 1.25 ml vials), 1,000 x 50 µl reactions
1725848	iQ Multiplex Powermix , 1.25 ml (1 x 1.25 ml vial), 50 x 50 µl reactions
1725849	iQ Multiplex Powermix , 5 ml (4 x 1.25 ml vials), 200 x 50 µl reactions

New Reliance One-Step Multiplex Supermix

Reliance one-step multiplex supermix is a ready-to-use, 4x reaction mix optimized for sensitive amplification of up to five targets in a single reaction. Expertly formulated with an optimal enzyme blend including Reliance reverse transcriptase, Sso7d DNA polymerase, and an advanced reaction buffer, this robust supermix delivers reproducible RT-qPCR performance in a multiplex fashion even with challenging templates, difficult targets, or in the presence of PCR inhibitors. With its exceptional room temperature stability for assembled reactions, it can be easily integrated into an automated workflow. Reliance one-step multiplex supermix is an ideal solution for multiplexed RT-qPCR, especially for pathogen/viral detection and high-throughput screening applications.

Key features and benefits of this robust supermix include:

- **Sensitive, reproducible multiplexing of up to 5 targets** — gets the most out of your samples while reducing costs
- **Room temperature stability of assembled reaction up to 24 hours** — enables use in an automated workflow to maximize throughput
- **Convenient one-tube supermix** — minimizes reaction setup time and handling errors
- **4x concentrated formulation** — increases detection sensitivity by maximizing input volume
- **Tolerant to common PCR inhibitors** — for use with lysates or samples of varying quality



Reliance one-step multiplex supermix allows researchers to:

- Amplify multiple targets with maximum efficiency
- Accelerate data throughput while decreasing costs and reaction time
- Achieve consistent and reproducible data, run after run
- Streamline automated workflows by bypassing the need for plate refrigeration

Instrument Compatibility

Reliance one-step multiplex supermix is compatible with all commercially available and all Bio-Rad real-time qPCR systems.

For More Information
Web: bio-rad.com/relianceonestep
Request or download bulletin: 7175

Ordering Information

Catalog #	Description
12010176	Reliance One-Step Multiplex RT-qPCR Supermix , 1 ml (1 x 1 ml vial), 200 x 20 µl reactions
12010220	Reliance One-Step Multiplex RT-qPCR Supermix , 5 ml (5 x 1 ml vials), 1,000 x 20 µl reactions
12010221	Reliance One-Step Multiplex RT-qPCR Supermix , 10 ml (2 x 5 ml vials), 2,000 x 20 µl reactions

See Also

PCR plastic consumables: page 408.

iTaq Universal SYBR® Green One-Step Kit

The iTaq universal SYBR® Green one-step kit is a fast and convenient solution for real-time PCR using the powerful combination of RNase H+ MMLV reverse transcriptase, specificity enhancer, and hot-start iTaq DNA polymerase in one fast reaction. It provides improved PCR efficiency, wider dynamic range, superior sensitivity and better specificity, and inhibitor tolerance without affecting performance, even with cell lysates.

- **Increase sensitivity, specificity, and efficiency** — advanced formulation enables robust performance with a wide variety of sample types and target sequences
- **Use any real-time PCR system** — the universal reference dye in this reaction mix enables ROX normalization of qPCR data regardless of the ROX level requirements of the qPCR system
- **Achieve superior real-time PCR results under most conditions** — robust formulation delivers consistent performance in fast cycling across a broad range of reaction conditions, primer concentrations, and temperature ranges
- **Obtain better results with PrimePCR assays** — real-time PCR assays are expertly designed and wet-lab validated to ensure optimal assay performance



Applications and Uses of iTaq Universal SYBR® Green One-Step Kit

- Real-time PCR
- Gene expression analysis
- Absolute quantification
- Pathogen/virus detection

Instrument Compatibility

The iTaq universal SYBR® Green one-step kit is compatible with all commercially available and all Bio-Rad real-time qPCR systems.

For More Information

Web: bio-rad.com/supermixes

Ordering Information

Catalog #	Description
1725150	iTaq Universal SYBR Green One-Step Kit , 25 µl RT (1 vial), 1 ml (1 x 1 ml vial) qPCR supermix, nuclease-free water (1 vial); 100 x 20 µl reactions
1725151	iTaq Universal SYBR Green One-Step Kit , 125 µl RT (1 vial), 5 ml (5 x 1 ml vials) qPCR supermix, nuclease-free water (1 vial); 500 x 20 µl reactions

iTaq Universal Probes One-Step Kit

The iTaq universal probes one-step kit is a fast and convenient solution for real-time PCR using the powerful combination of RNase H+ MMLV reverse transcriptase and hot-start iTaq DNA polymerase in one fast reaction. It provides improved PCR efficiency, wider dynamic range, superior sensitivity and specificity, and inhibitor tolerance without affecting performance, even with cell lysates.

- **Increase sensitivity, specificity, and efficiency** — advanced formulation enables robust performance with a wide variety of sample types and target sequences
- **Obtain superior results with multiplex reactions** — enhanced chemistry enables up to 3 target amplifications at the same time, resulting in higher data precision with fewer pipetting steps and reduced sample usage
- **Carry out high-throughput real-time PCR screening and validation** — simplified workflow and reduced cycling times enable screening and validation of a great number of samples and targets in a short period of time
- **Use any real-time PCR system** — the universal reference dye in this reaction mix enables ROX normalization of qPCR data regardless of the ROX level requirements of the qPCR system
- **Achieve superior real-time PCR results under most conditions** — robust formulation delivers consistent performance in fast cycling across a broad range of reaction conditions, primer concentrations, and temperature ranges



Applications and Uses of iTaq Universal Probes One-Step Kit

- Real-time PCR
- Gene expression analysis
- Multiplexing
- Absolute quantification
- Pathogen/virus detection

Instrument Compatibility

The iTaq universal probes one-step kit is compatible with all commercially available and all Bio-Rad real-time qPCR systems.

For More Information

Web: bio-rad.com/supermixes

See Also

PCR plastic consumables: page 408.

Ordering Information

Catalog #	Description
1725140	iTaq Universal Probes One-Step Kit , 50 µl RT (1 vial), 1 ml (1 x 1 ml vial) qPCR supermix, nuclease-free water (1 vial); 100 x 20 µl reactions
1725141	iTaq Universal Probes One-Step Kit , 250 µl RT (1 vial), 5 ml (5 x 1 ml vials) qPCR supermix, nuclease-free water (1 vial), 500 x 20 µl reactions

SsoAdvanced PreAmp Supermix

SsoAdvanced PreAmp supermix is a 2x concentrated, ready-to-use reaction master mix optimized for unbiased, target-specific preamplification of cDNA and gDNA. This supermix preamplifies DNA templates using up to 400 PrimePCR PreAmp assays (for use downstream with PrimePCR gene expression assays), custom designed SYBR® Green or hydrolysis probe assays, and TaqMan assays.

Sso7d Fusion Polymerase Technology Enables Unbiased Preamplification

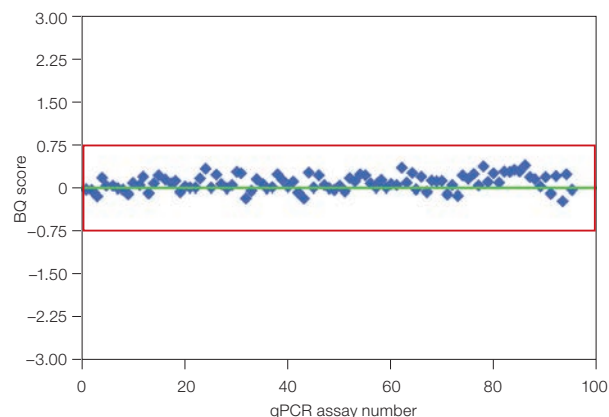
The SsoAdvanced PreAmp supermix utilizes our highly processive Sso7d fusion polymerase to enable preamplification of up to 400 targets with minimal bias. The increased processivity of the Sso7d fusion polymerase ensures that all targets — even difficult targets — are amplified efficiently. This reduction of preamplification bias is critical for ensuring accuracy of the results from downstream quantitative real-time PCR analysis.

- **Analyze up to 400 targets** — when the number of genes that can be analyzed in an experiment is limited by the amount of sample, preamplification will extend the amount of sample available for analysis
- **Requires as little as 100 pg DNA** — enables analysis of any precious or limited sample, such as stem cells, laser capture microdissections, and formalin-fixed paraffin-embedded tissues
- **Optimized for use with PrimePCR assays** — use PrimePCR PreAmp assays before downstream analysis with PrimePCR gene expression assay

For More Information

Web: bio-rad.com/PreAmp

Request or download bulletin: 6576



Minimal bias observed during preamplification of 100 targets.

Preamplification was performed on a cDNA sample for ten cycles using SsoAdvanced PreAmp supermix and 100 PrimePCR PreAmp assays. The preamplified cDNA was diluted and used in qPCR analysis alongside cDNA that was not subject to preamplification. The bias quantification (BQ) score shows the difference in the results (quantification cycle [Cq] value) for the samples with and without preamplification. BQ scores close to zero indicate a lack of preamplification bias.

Ordering Information

Catalog #	Description
1725160	SsoAdvanced PreAmp Supermix, 1.25 ml (1 x 1.25 ml vial), 50 x 50 µl reactions

SingleShot Cell Lysis Kits

SingleShot cell lysis kits rapidly generate cell lysates that are optimized for reverse transcription quantitative PCR (RT-qPCR) analysis without RNA purification.

Features include:

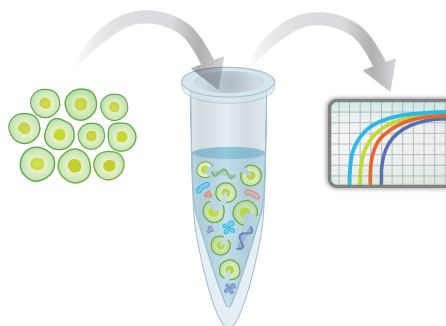
- Compatibility with 10–100,000 adherent or suspension cells
- Lysates prepared in 20 minutes
- Complete removal of genomic DNA
- Preservation of RNA integrity by an RNase inhibitor
- Simple, short protocol suitable for automation and high-throughput experiments
- No loss of rare transcripts from column purification
- Produces accurate and sensitive qPCR data
- Validated with PrimePCR assays and panels
- Results comparable to those produced using purified RNA

SingleShot Cell Lysis Kit

The SingleShot cell lysis kit provides the reagents necessary for producing RT-qPCR-ready cell lysates in approximately 20 minutes. Reagents for RT-qPCR are not included.

SingleShot Two-Step Kits

SingleShot two-step kits include reagents to perform RT-qPCR using a two-step workflow with separate cDNA



synthesis and qPCR steps. These kits provide RT-qPCR data from cultured cells in just a little over 2 hours. The SingleShot RNA control is included to help optimize cell number input and the amount of lysate used in the RT-qPCR.

SingleShot One-Step Kits

SingleShot one-step kits include reagents to perform one-step RT-qPCR utilizing integrated cDNA synthesis and qPCR steps. These kits provide RT-qPCR data from cultured cells in approximately 1.5 hours. The SingleShot RNA control is included to help optimize cell number input and the amount of lysate used in the RT-qPCR.

For More Information
Web: bio-rad.com/singleshot

Ordering Information

Catalog #	Description
1725080	SingleShot Cell Lysis Kit , 100 x 50 µl reactions
1725081	SingleShot Cell Lysis Kit , 500 x 50 µl reactions

One-Step Kits

1725070	SingleShot Probes One-Step Kit , 100 x 50 µl reactions
1725095	SingleShot SYBR Green One-Step Kit , 100 x 50 µl reactions

Two-Step Kits

1725090	SingleShot Probes Kit , 100 x 50 µl reactions
1725085	SingleShot SYBR Green Kit , 100 x 50 µl reactions

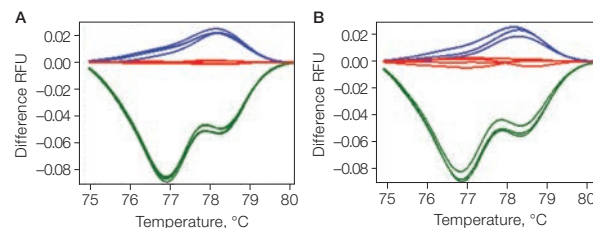
Precision Melt Supermix (HRM)

- Sensitive and specific discrimination of class I–IV SNPs across a broad range of amplicons
- Ideal solution for insertions or deletions >6 base pairs
- De novo SNP discovery
- Accurate quantification of CpG methylation status for epigenetic studies
- Ideal for mutation screening of small mutations or when using a primer walking approach for larger regions
- Exceptional room temperature stability for high-throughput high resolution melt (HRM) studies
- Optimized formulation containing EvaGreen® dye delivers robust PCR and HRM performance

For More Information

Web: bio-rad.com/supermixes

Download bulletins: 5798 and 6137



Exceptional stability enables high-throughput genotyping analysis with precision melt supermix.

Specific amplification and accurate discrimination of a class IV SNP (84 bp amplicon) from mouse genomic DNA was performed on a CFX384 real-time PCR detection system either 0 hr (A) or 48 hr (B) after reaction setup. Wild type (■), heterozygote (■), and homozygous mutant (■) are shown in the difference plots normalized to wild-type samples. Total run time including melt curve = 150 min. RFU, relative fluorescence units.

Ordering Information

Catalog #	Description
1725110	Precision Melt Supermix , 2 ml (2 x 1 ml vials), 200 x 20 µl reactions
1725112	Precision Melt Supermix , 10 ml (10 x 1 ml vials), 1,000 x 20 µl reactions

ZDC Multiplex RT-PCR Assay*

The ZDC multiplex RT-PCR assay is a one-step reverse transcription PCR (RT-PCR) assay for the simultaneous detection of Zika (ZIKV), dengue (DENV 1–4), and chikungunya (CHIKV) viral RNAs by real-time PCR. The assay includes all the controls needed for reliable results, thus providing researchers with a robust tool to identify ZIKV, DENV, and CHIKV nucleic acids in RNA extracted from a wide range of sample types.

- Enough to perform 200 tests
- 1-step procedure with RT and amplification performed in a single tube
- 3-plex assay for the simultaneous detection of ZIKV, DENV 1–4, and CHIKV RNA
- Internal control included for use as a fourth target in the multiplex assay
- Wet-lab validated on the CFX96 Touch real-time PCR detection system and Applied Biosystems 7500 real-time PCR system
- Compatible with most quantitative PCR (qPCR) systems on the market
- Compatible with RNA extracted from multiple starting materials (serum, plasma, serum-free body fluids, cerebrospinal fluids, and mosquitoes)
- High-standard GMP manufacturing procedures used for key components of the kit
- Compatible with RNase P detection assays as additional or alternative internal control



RNase P Detection Assays

The RNase P assays are hydrolysis probe-based assays for the detection of human RNase P nucleic acid sequence. Available in two different configurations, Cy5.5 and TAMRA, the RNase P assay can be included as an additional control in the ZDC multiplex RT-PCR and other assays.

* For research use only, not for diagnostic purposes.

For More Information
Web: bio-rad.com/ZDCassay
Download bulletin: 6978

Ordering Information

Catalog #	Description
12003818	ZDC Multiplex RT-PCR Assay , reverse transcription PCR assay for the detection of Zika, dengue, and chikungunya viral RNAs, 200 reactions
12004601	RNase P Assay (Cy5.5) , pkg of 1, vial, 440 µl 12.5x concentrated primers/probe solution
12004602	RNase P Assay (TAMRA) , pkg of 1, vial, 440 µl 12.5x concentrated primers/probe solution
12004860	ZDC Clear Control Solution , pkg of 1, 5 ml tube, for use with RNase P assay and ZDC multiplex RT-PCR assay
12005062	ZDC Buffer T , pkg of 5, 1.8 ml tubes, for use with ZDC multiplex RT-PCR assay

Reverse Transcription Reagents

Bio-Rad's reverse transcription reagents are formulated for efficient reverse transcription across a broad linear dynamic range. A potent RNase A inhibitor protects RNA during setup and reverse transcription. Reagents have flexible input RNA capacity to suit different experimental needs and are optimized for gene expression analysis using real-time PCR.

For More Information

Web: bio-rad.com/RTreagents

bio-rad.com/rt_tutorial

Feature	RECOMMENDED Minimum Reaction Setup Time	Effective Genomic DNA Removal before RT	Maximum Input RNA for High cDNA Yields	Flexible Priming Options	Reliable Value Solution
Product	iScript Reverse Transcription Supermix for RT-qPCR	iScript gDNA Clear cDNA Synthesis Kit	iScript Advanced cDNA Synthesis Kit for RT-qPCR	iScript Select cDNA Synthesis Kit	iScript cDNA Synthesis Kit
Applications	<ul style="list-style-type: none"> Gene expression RNA quantification 	<ul style="list-style-type: none"> Gene expression RNA quantification 	<ul style="list-style-type: none"> Gene expression RNA quantification 	<ul style="list-style-type: none"> Gene expression Cloning RNA quantification 	<ul style="list-style-type: none"> Gene expression RNA quantification
Total input RNA	1 µg–1 pg	1 µg–1 pg	7.5 µg–100 fg	1 µg–1 pg	1 µg–100 fg
Format	1 tubes	3 tubes	2 tubes	5 tubes	2 tubes
Kit contents	<ul style="list-style-type: none"> 5x iScript RT supermix No-RT control supermix 	<ul style="list-style-type: none"> 5x iScript RT supermix No-RT control supermix DNase DNase buffer 	<ul style="list-style-type: none"> iScript reverse transcriptase 5x iScript advanced reaction mix 	<ul style="list-style-type: none"> iScript reverse transcriptase 5x iScript reaction mix 3 priming options 	<ul style="list-style-type: none"> iScript reverse transcriptase 5x iScript reaction mix
Time to produce cDNA	26 min	36 min	21 min	40–90 min	26 min
RNase H+ activity	High	High	High	High	High

iScript Reverse Transcription Kits

iScript Advanced cDNA Synthesis Kit for RT-qPCR

- Increased qPCR data throughput and cost effectiveness from a single 20 µl RT reaction
- Superior sensitivity and broad linear dynamic range for RT (7.5 µg–100 fg)
- 2-tube kit (5x iScript reaction mix and iScript reverse transcriptase) for ease of use and reduced reaction setup time
- Optimized blend of oligo(dT) and random primers ensures complete and unbiased RNA sequence representation
- RNase H+ MMLV reverse transcriptase (preblended with RNase inhibitor) delivers high sensitivity for reverse transcription quantitative PCR (RT-qPCR) and eliminates additional RNase H+ step
- Potent blend of RNase A inhibitor protects RNA during setup and RT
- Short 21 min protocol allows fast qPCR data generation



iScript Reverse Transcription Supermix for RT-qPCR

- 1-tube format for simple and fast setup and reduced pipetting variability
- 5x formulation enables RNA volumes up to 16 µl, avoiding the need to concentrate your sample
- Liquid format at –20°C offers superior stability and eliminates freeze/thaw cycle

- Superior sensitivity and broad linear dynamic range for RT (1 µg–1 pg)
- Optimized blend of oligo(dT) and random primers ensures complete and unbiased RNA sequence representation
- RNase H+ MMLV reverse transcriptase (preblended with RNase inhibitor) delivers high sensitivity for RT-qPCR and eliminates additional RNase H+ step
- Potent blend of RNase A inhibitor protects RNA during setup and RT
- Short 26 min protocol allows fast qPCR data generation

iScript cDNA Synthesis Kit

- 2-tube kit (5x iScript reaction mix and iScript reverse transcriptase) for ease of use and reduced reaction setup time
- Superior sensitivity and broad linear dynamic range for RT (1 µg–100 fg)
- Optimized blend of oligo(dT) and random primers ensures complete and unbiased RNA sequence representation
- RNase H+ MMLV reverse transcriptase (preblended with RNase inhibitor) delivers high sensitivity for RT-qPCR and eliminates additional RNase H+ step
- Potent blend of RNase A inhibitor protects RNA during setup and RT
- Short 26 min protocol allows fast qPCR data generation

iScript Select cDNA Synthesis Kit

- 5-tube kit (random primers, oligo(dT), 5x iScript Select reaction mix, iScript reverse transcriptase, and gene-specific primer-enhancer solution)
- Choice of priming strategy
- Reliable synthesis of long cDNA >6 kb in length
- Superior sensitivity and broad linear dynamic range for RT (1 µg–1 pg)

iScript gDNA Clear cDNA Synthesis Kit

iScript gDNA clear cDNA synthesis kit generates qPCR-ready cDNA free of gDNA for accurate gene expression analysis in as little as 36 minutes. The kit consists of the iScript reverse transcription supermix and a specially formulated DNase. Features and benefits include:

- Effective gDNA clearance in 10 min with a specially formulated DNase
- Convenient all-in-one RT supermix for simple and fast setup and reduced pipetting variability
- Simple workflow and short 36 min protocol for fast generation of gDNA-free cDNA
- Ready-to-use no RT control included in the kit to monitor gDNA contamination

For More Information

[Request or download bulletin: 6090](#)

Ordering Information

Catalog #	Description
iScript Advanced cDNA Synthesis Kit for RT-qPCR	
1725037	iScript Advanced cDNA Synthesis Kit for RT-qPCR , 25 x 20 µl reactions, includes 100 µl 5x iScript advanced reaction mix, 25 µl iScript advanced reverse transcriptase, and nuclease-free water
1725038	iScript Advanced cDNA Synthesis Kit for RT-qPCR , 100 x 20 µl reactions, includes 400 µl 5x iScript advanced reaction mix, 100 µl iScript advanced reverse transcriptase, and nuclease-free water
iScript Reverse Transcription Supermix for RT-qPCR	
1708840	iScript Reverse Transcription Supermix for RT-qPCR , 25 x 20 µl reactions, includes 100 µl 5x iScript RT supermix, 200 µl 5x iScript RT supermix no-RT control (50 reactions), and nuclease-free water
1708841	iScript Reverse Transcription Supermix for RT-qPCR , 100 x 20 µl reactions, includes 400 µl 5x iScript RT supermix, 200 µl 5x iScript RT supermix no-RT control (50 reactions), and nuclease-free water
iScript cDNA Synthesis Kit	
1708890	iScript cDNA Synthesis Kit , 25 x 20 µl reactions, includes 100 µl 5x iScript reaction mix, 25 µl iScript reverse transcriptase, and nuclease-free water
1708891	iScript DNA Synthesis Kit , 100 x 20 µl reactions, includes 400 µl 5x iScript reaction mix, 100 µl iScript reverse transcriptase, and nuclease-free water
iScript Select cDNA Synthesis Kit	
1708896	iScript Select cDNA Synthesis Kit , 25 x 20 µl reactions, includes 400 µl iScript Select reaction mix, 25 µl iScript reverse transcriptase, 200 µl oligo(dT) mix, 200 µl random primer mix, 200 µl gene-specific primer enhancer solution, and nuclease-free water
1708897	iScript Select cDNA Synthesis Kit , 100 x 20 µl reactions, includes 400 µl iScript Select reaction mix, 100 µl iScript reverse transcriptase, 200 µl oligo(dT) mix, 200 µl random primer mix, 200 µl gene-specific primer enhancer, and nuclease-free water
iScript gDNA Clear cDNA Synthesis Kit	
1725034	iScript gDNA Clear cDNA Synthesis Kit , 25 x 20 µl reactions, includes 100 µl 5x iScript RT supermix, 200 µl 5x iScript no-RT control supermix, 12.5 µl iScript DNase, 150 µl iScript DNase buffer, 1.5 ml nuclease free water
1725035	iScript gDNA Clear cDNA Synthesis Kit , 100 x 20 µl reactions, includes 400 µl 5x iScript RT supermix, 400 µl 5x iScript no-RT control supermix, 50 µl iScript DNase, 150 µl iScript DNase buffer, 1.5 ml nuclease free water

iScript Explore One-Step RT and PreAmp Kit

The iScript Explore kit includes a highly sensitive reagent to generate preamplified cDNA directly from RNA in a single step. This kit is well suited for detecting many targets from a limited sample or for reliable detection of targets expressed at low levels. The reagent's patented* Sso7d fusion protein provides unbiased target-specific preamplification of up to 100 targets. The kit also integrates an effective genomic DNA removal step, which helps ensure only the transcripts of interest are detected by quantitative PCR.

- Eliminates protocol steps by completing reverse transcription and preamplification in a single step
- Enables reliable detection of genes expressed at low levels
- Facilitates highly sensitive detection of a large number of targets
- Incorporates an effective genomic DNA removal step, providing confidence that results are only for the transcript of interest

For More Information

Web: bio-rad.com/iscriptexplorekit



Ordering Information

Catalog #	Description
12004856	iScript Explore One-Step RT and PreAmp Kit , 50 x 50 µl reactions, includes 100 µl iScript advanced reverse transcriptase, 1.25 ml 2x preamplification mix, 100 µl reaction booster, 50 µl DNase, 150 µl DNase buffer, and nuclease-free water
17002826	iScript Explore One-Step RT and PreAmp Kit , 250 x 50 µl reactions, includes 5 x 100 µl iScript advanced reverse transcriptase, 5 x 1.25 ml 2x preamplification mix, 5 x 100 µl reaction booster, 5 x 50 µl DNase, 5 x 150 µl DNase buffer, and nuclease-free water

* U.S. patents 6,627,424; 7,541,170; and 7,560,260.

Standard PCR Reagents

iProof High-Fidelity DNA Polymerase

- A high-fidelity DNA polymerase with 52-fold more accuracy than Taq DNA polymerase
- Unique *Pyrococcus*-like proofreading enzyme is fused to a dsDNA binding protein, Sso7d
- Long and fast PCR applications — fragments up to 37 kb are amplified in less time (15–30 sec/kb) and with less enzyme (0.25–1 U/reaction)
- Convenient 2x supermix formats available with GC or HF high-fidelity buffers



For More Information

Web: bio-rad.com/standardpcrreagents
 Request or download bulletin: 5211

dNTP Mix

- Formulated for consistency and higher efficiency in PCR and qPCR
- Robust dNTP solution withstands multiple rounds of freeze-thawing and temperature cycling

iTaq DNA Polymerase

- Antibody-mediated hot-start DNA polymerase for quick 3 min activation at 95°C
- The hot-start polymerase prevents nonspecific amplification and primer-dimers in both PCR and real-time PCR applications

For More Information
 Download bulletin: 2779

Ordering Information

Catalog #	Description
iProof High-Fidelity DNA Polymerase, Master Mixes, and Buffers	
1725300	iProof High-Fidelity DNA Polymerase, 2 U/μl, 20 U, includes 5x reaction buffers, MgCl ₂ solution, DMSO
1725301	iProof High-Fidelity DNA Polymerase, 2 U/μl, 100 U
1725302	iProof High-Fidelity DNA Polymerase, 2 U/μl, 500 U
1725330	iProof High-Fidelity PCR Kit, 2 U/μl, 50 U, includes 5x reaction buffers, MgCl ₂ solution, DMSO, dNTPs, λ DNA, 1.3 and 10 kb primers, DNA standard
1725331	iProof High-Fidelity PCR Kit, 2 U/μl, 200 U, includes 5x reaction buffers, MgCl ₂ solution, DMSO, dNTPs, λ DNA, 1.3 and 10 kb primers, DNA standard
1725310	iProof HF Master Mix, 2.5 ml, 100 x 50 μl reactions (for highest fidelity with most templates)
1725320	iProof GC Master Mix, 2.5 ml, 100 x 50 μl reactions (for GC-rich templates)
dNTP Mix	
1708874	dNTP Mix, 200 μl premixed solution, contains 10 mM each dNTP (dATP, dCTP, dGTP, dTTP)
iTaq DNA Polymerase	
1708870	iTaq DNA Polymerase, 5 U/μl, includes 250 U polymerase, 1.25 ml 10x PCR buffer
1708875	iTaq DNA Polymerase, 5 U/μl, includes 5,000 U polymerase, 25 ml 10x PCR buffer, 25 ml 50 mM MgCl ₂ solution
MgCl₂	
1708872	MgCl ₂ Solution, 50 mM, 1.25 ml

PCR and Real-Time PCR Accessories

ROX Passive Reference Dye

- Formulated as a 50x concentrated stock solution for use on Applied Biosystems 7000, 7300, 7700, and 7900 qPCR instruments
- For instruments that use 580–585 nm excitation for passive reference, such as Stratagene Mx3000P, Mx3005P, and Mx4000, and Applied Biosystems 7500 real-time PCR instruments, treat as a 750x concentrated solution
- An internal reference is not required for any Bio-Rad real-time detection system

For More Information

Request or download bulletin: 6090

Precision Blue Real-Time PCR Dye

- Concentrated, ready-to-use dye to increase visibility of real-time PCR reaction mixtures
- Optimized for use with all Bio-Rad universal real-time supermixes and one-step kits

Ordering Information

Catalog #	Description
1725858	ROX Passive Reference Dye , 0.5 ml
1725555	Precision Blue Real-Time PCR Dye , 55 µl, 200x concentrated blue visualization dye for use with real-time PCR systems

PCR Plate Sealer

PX1 PCR Plate Sealer

The PX1 PCR plate sealer consistently seals PCR plates by providing uniform heat and pressure across an entire microplate when sealing. This semiautomated heat sealer helps deliver reliable results by removing human variability from plate sealing and minimizing sample evaporation.

The PX1 sealer features an easy-to-use, intuitive touch-screen interface. The thermal sealing process is simplified by allowing sealing temperature and time to be modified with the touch of a button.

- **Fast startup time** — avoid delaying an experiment while the sealer warms up
- **Extremely intuitive** — save time programming the instrument
- **Quickly access sealing protocols** — save programming time by using stored protocols



- **Compact footprint** — accommodate crowded laboratory benches
- **Fully validated** — have confidence in your results

For More Information

Web: bio-rad.com/pcrplatesealer
Request or download bulletin: 6257

See Also

Heat sealing films and foils: page 420.

SsoAdvanced universal SYBR® Green supermix: page 390.

iTaq universal SYBR® Green supermix: page 393.

Ordering Information

Catalog #	Description
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PX1 PCR Plate Sealer

1814000	PX1 PCR Plate Sealer , includes heat sealing instrument, 96-well/384-well plate support block, sealing frame, power cord
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Accessories

1814080	Sealing Frame , extra sealing frame for use with PX1 PCR plate sealer, 1
1814085	Plate Support Block , extra plate support block for use with PX1 PCR plate sealer, 1

Heat Seals for PX1 PCR Plate Sealer

1814030	Optically Clear Heat Seal , package of 100
1814035	Permanent Clear Heat Seal , package of 100
1814040	Pierceable Foil Heat Seal , package of 100
1814045	Peelable Foil Heat Seal , package of 100

For more information about heat seals that are compatible with the PX1 PCR plate sealer, see page 420.

PCR Plastic Consumables

Bio-Rad thin-wall PCR tubes, PCR plates, seals, and accessories are manufactured for optimal fit and cycling performance in a variety of thermal cyclers and real-time PCR instruments, including all Bio-Rad platforms. These high-quality consumables are suitable for a wide variety of applications. Bio-Rad tubes, tube caps, and PCR plates are molded, inspected, and packaged in a Class 100,000 or 10,000 cleanroom environment to prevent possible nucleic acid or nuclease contamination, then process-sampled and tested to be negative for DNase, RNase, and human DNA.

For More Information

Web: bio-rad.com/pcrplastics

Request or download bulletin: 6090

Instrument Compatibility of PCR Plastic Consumables

Product	Individual and Strip Tubes			384-Well Plates		96-Well Plates	
	Individual High-Profile	Strips High-Profile	Strips Low-Profile	Hard-Shell Standard	Hard-Shell 480	Microseal Semi-Skirted High-Profile	Microseal Skirted Low-Profile
	TBI0201, TWI0201 page 410	TBCxxxx,* TBSxxxx* page 410	TLS08xx* page 410	HSP3xxx* page 416	HSR48xx* page 417	MSSxxxx* page 415	MSP9xxx* page 415
Thermal Cycler							
Bio-Rad C1000, C1000 Touch, S1000	•	•	•	•	•		•
Bio-Rad DNA Engine, Tetrad, Tetrad 2, Dyad, Dyad Disciple, PTC-100	•	•	•	•	•		•
Bio-Rad T100, MyCycler, iCycler	•	•					
Bio-Rad MJ Mini	•	•	•				
Applied Biosystems 0.2 ml tube cyclers (2720, 9700, Veriti)	•	•				•	
Applied Biosystems 0.1 ml tube cyclers (9800 fast, Veriti fast)			•				
Applied Biosystems 384-well cyclers (9700, Veriti)				•	•		
Eppendorf Mastercycler series	•	•	•	•	•		•
Real-Time PCR Instrument							
Bio-Rad CFX Connect, CFX96, CFX96 Touch, CFX384,** CFX384 Touch**			•	•	•		•
Bio-Rad iCycler iQ, iQ5, MyiQ, MyiQ2		•					
Bio-Rad Chromo4		•	•				•
Bio-Rad DNA Engine Opticon, Opticon 2		•				•	
Bio-Rad MiniOpticon**			•				
Applied Biosystems standard systems (7300, 7500, 7900HT, ViiA 7)		•		•	•	•	
Applied Biosystems fast systems (7500 fast, 7900HT fast, StepOne, StepOnePlus, ViiA 7)			•	•	•		
Eppendorf Mastercycler ep <i>realplex</i>		•	•				•
Stratagene (Agilent) Mx series		•					
Corbett (QIAGEN) Rotor-Gene	•						
Roche LightCycler 480					•		
Other Instruments							
Applied Biosystems DNA sequencers (3100, 3700, 3730)				•		•	
Idaho Technology LightScanner				•			•

continues

Instrument Compatibility of PCR Plastic Consumables (cont.)

Product	96- and 48-Well Plates						
	Hard-Shell Semi-Skirted High-Profile	Hard-Shell Skirted Low-Profile	Hard-Shell Semi-Skirted Low-Profile	Hard-Shell 480	Multiplate Unskirted High-Profile	Multiplate Unskirted Low-Profile	iQ Semi-Skirted High-Profile
	HSS9xxx* page 413	HSP9xxx* page 413	HSL9xxx page 413	HSR9xxx page 413	MLPxxxx* page 414	MLLxxxx* page 414	2239441 page 415
Thermal Cycler							
Bio-Rad C1000, C1000 Touch, S1000	•	•	•		•	•	•
Bio-Rad DNA Engine, DNA Engine Tetrad, DNA Engine Tetrad 2, DNA Engine Dyad, Dyad Disciple, PTC-100	•	•			•	•	•
Bio-Rad MyCycler					•		•
Bio-Rad T100, iCycler	•				•		•
Bio-Rad MJ Mini					•	•	
Applied Biosystems 0.2 ml tube cyclers (2720, 9700, Veriti)	•				•		•
Applied Biosystems 0.1 ml tube cyclers (9800 fast, Veriti fast)			•			•	
Eppendorf Mastercycler series	•	•	•		•	•	•
Real-Time PCR Instrument							
Bio-Rad CFX Connect, CFX96, CFX96 Touch		•	•			•	
Bio-Rad iCycler iQ, iQ 5, MyiQ, MyiQ2	•				•		•
Bio-Rad Chromo4	•	•			•	•	•
Bio-Rad DNA Engine, DNA Engine Opticon, Opticon 2		•				•	
Bio-Rad MiniOpticon**						•	
Applied Biosystems standard systems (7500, 7900HT, ViiA 7)	•				• Except 7900HT		• Except 7900HT
Applied Biosystems (StepOnePlus)						•	
Applied Biosystems (7500 fast, ViiA 7 fast)			•			•	
Applied Biosystems (QuantStudio 96 Standard)	•						
Eppendorf Mastercycler ep <i>realplex</i>	•	•	•		•	•	•
Stratagene (Agilent) Mx series	•				•		•
Roche LightCycler 480/96				•			
Other Instruments							
Applied Biosystems DNA sequencers (3100, 3700, 3730)	•				•		
Idaho Technology LightScanner		•			•	•	

* Go to the page numbers shown for the list of catalog numbers containing this prefix.

** CFX384, CFX384 Touch, and MiniOpticon real-time PCR detection systems are factory calibrated for white tubes and white-well plates. White plastics are recommended due to their superior signal-to-noise ratio. Using clear tubes or clear-well plates on these instruments will require user calibration.

Thin-Wall PCR Tubes

PCR Tubes and Strips

Individual PCR Tubes, 0.2 and 0.5 ml

These high-profile PCR tubes have double-locking caps that won't pop open during cycling. PCR volume ranges are 5–125 μ l for 0.2 ml tubes and 10–200 μ l for 0.5 ml tubes. Tubes with flat, frosted caps for easy labeling are available in both 0.2 and 0.5 ml sizes (not suitable for real-time PCR). The 0.5 ml individual tubes with attached caps are available in resealable plastic bags of 100 tubes.



PCR Tube and Cap Strips

Both tubes and caps are available in strips of 8 or 12 for use in 48- and 96-well sample blocks.

- Tight sealing and convenient handling for multiple samples
- Choice of domed or flat optical cap strips

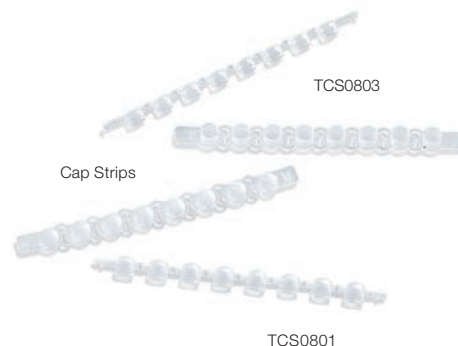
High-Profile PCR Tube Strips

Recommended reaction volumes are 5–125 μ l. Tube strips and domed cap strips are also available packaged together in convenient bags sufficient for 96 samples. The resealable bags protect unused tubes and caps from accidental contamination.



Low-Profile PCR Tube Strips

These tubes reduce the potential for condensation and also allow greater light capture in fluorescence assays such as those performed in real-time PCR. Low-profile tubes are ideal for use in fast and low-volume PCR reactions. Overall height, including flat optical caps and 96-place rack, is 18.3 mm. Tube height is 15.5 mm. Low-profile tubes are available in opaque white for optical applications.



Flat and Domed Cap Strips for PCR Tubes and PCR Plates

These cap strips provide extremely tight sealing of all Bio-Rad PCR tubes and plates during thermal cycling and cold storage. Flat cap strips feature ultraclear upper surfaces, which are ideal for fluorescence applications. Average light transmittance is 1.7-fold higher than with standard-clarity domed cap strips. Flat caps are available in strips of 8 and domed caps are available in strips of 8 or 12. Use of a capping tool is recommended for proper sealing of caps on tubes or plates.

For More Information

Web: bio-rad.com/pcrplastics

Ordering Information

Catalog # Description

Individual PCR Tubes with Attached Caps (0.2 ml)

TFI0201 PCR Tubes with Flat Caps (0.2 ml), clear, 1,000
 TWI0201 PCR Tubes with Domed Caps (0.2 ml), clear, 1,000

Individual PCR Tubes without Caps (0.2 ml)

TBI0201 PCR Tubes without Caps (0.2 ml), clear, 1,000

Individual PCR Tubes with Attached Caps (0.5 ml)

TBI0501 PCR Tubes with Flat Caps (0.5 ml), clear, 1,000 (2 bags of 500)
 TBI0502 PCR Tubes with Flat Caps (0.5 ml), clear, 800 (8 bags of 100)

High-Profile Tube Strips without Caps (0.2 ml)

TBS0201 8-Tube Strips without Caps, clear, 125 strips (1,000 PCR tubes)
 TBS1201 12-Tube Strips without Caps, clear, 100 strips (1,200 PCR tubes)

Low-Profile 8-Tube Strips without Caps (0.2 ml)

TLS0801 Low-Profile 8-Tube Strips without Caps, clear, 120 strips (960 PCR tubes)
 TLS0851 Low-Profile 8-Tube Strips without Caps, white, 120 strips (960 PCR tubes)

Domed Cap Strips

TCS0801 Domed 8-Cap Strips, for PCR tubes and plates, clear, 130
 TCS1201 Domed 12-Cap Strips, for PCR tubes and plates, clear, 200

Optical Flat Cap Strips

TCS0803 Optical Flat 8-Cap Strips, for PCR tubes and plates, ultraclear, 120

High-Profile Polypropylene Tube Strips with Domed Cap Strips (0.2 ml)

TBC0802 8-Tube Strips and Domed Cap Strips, clear, 20 bags of 12 x 8-tube strips and 12 x 8-cap strips (1,920 PCR tubes and caps)
 TBC1202 12-Tube Strips and Domed Cap Strips, clear, 20 bags of 8 x 12-tube strips and 8 x 12-cap strips (1,920 PCR tubes and caps)

Capping Tools and Racks**96-Place PCR Tube Rack and Cover**

These stackable storage units for tubes and unskirted and semi-skirted PCR plates provide a stable platform for preparing or centrifuging reactions.

PCR Tube Rack

The PCR tube rack conforms to ANSI/SBS standards and provides a stable platform for PCR tubes and 96-well plates.

Easy Cap Tool

The Easy Cap tool provides the pressure necessary to achieve a tight seal, one tube at a time, when capping individual or strip tubes. The narrow end securely fastens domed caps to tubes or 96-well PCR plates. The wide end firmly holds thin-wall 0.5 ml tubes to prevent accidental crushing when opening or closing. The side slot allows easy opening of tight-fitting caps without generating aerosols.

Strip Cap Tool

This tool quickly and easily seals 8- and 12-cap strips on PCR plates or tubes. A grooved channel on one side is designed to seal domed caps, while the flat edge on the opposite side seals flat caps. For best results, seal tube strips while they are in a thermal cycler block or in a 96-place rack.

96-Place PCR Tube Racks and Covers



Easy Cap Tool



PCR Tube Rack



Strip Cap Tool

For More Information
 Web: bio-rad.com/PCRplasticaccessories

Ordering Information

Catalog #	Description
TRC9601	PCR Tube Racks , ANSI/SBS standard, white, 10
TRC0501	96-Place Racks , with covers, for PCR tubes and unskirted and semi-skirted microplates, assorted colors, 5
ECT1000	Easy Cap Tool , ensures tight seal for 0.2 ml PCR tubes or 96-well microplates
ECT2000	Strip Cap Tool , for sealing 8- and 12-cap strips on PCR plates or tubes

PCR Plates

Multiplate 48-Well PCR Plates

The versatile, unskirted design and 48-well format make these Multiplate unskirted PCR plates ideal for laboratories using 48-well blocks on Bio-Rad instruments. The plates are suitable for reaction volumes of 5–125 μ l. The polypropylene construction of Multiplate PCR plates confers very low protein binding and excellent preservation of sample volume. When less than a full plate is needed, these plates can be easily cut with scissors to the required size. Two plate styles are available:

- **High-profile (20.7 mm) wells, clear color** — designed to fit in most thermal cyclers
- **Low-profile (15.5 mm) wells, clear color or white** — optimized for fast PCR and low-volume reactions

For More Information

Web: bio-rad.com/48wellpcrplates



Multiplate High-Profile 48-Well Unskirted PCR Plate



Multiplate Low-Profile 48-Well Unskirted PCR Plate

Ordering Information

Catalog #	Description
MLP4801	Multiplate High-Profile 48-Well Unskirted PCR Plates , clear, 50 plates
MLL4801	Multiplate Low-Profile 48-Well Unskirted PCR Plates , clear, 50 plates
MLL4851	Multiplate Low-Profile 48-Well Unskirted PCR Plates , white, 50 plates

Hard-Shell 96-Well PCR Plates

Hard-Shell PCR plates are specifically designed to withstand the stresses of heat sealing, thermal cycling, and robotic handling. The patented* two-component design features a skirt and deck molded from a rigid, thermostable polymer. The thin-wall wells are molded of virgin polypropylene selected for low DNA binding. These plates can withstand -80°C storage and high centrifugation forces, making them convenient for alcohol precipitations. Uniform wells reduce well-to-well variability in optical assays.

- White-well option allows increased fluorescent signal strength
- Black alphanumeric labeling for easy well identification
- Color-coded skirts with clear or white wells
- Low-cost, user-readable barcode option

Hard-Shell Low-Profile 96-Well Skirted PCR Plates

- Reaction volumes of 5–125 μl (200 μl maximum)
- Low-profile (16.06 mm) wells optimized for low-volume reactions and fast PCR
- Full skirt for robotic handling and labeling surface
- Footprint and well spacing that match ANSI/SBS standard dimensions
- Barcoded plates are available

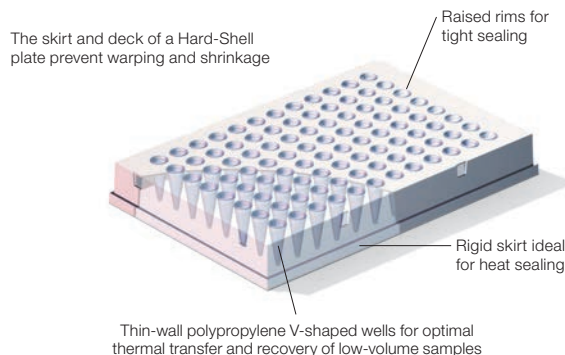
Hard-Shell High-Profile 96-Well Semi-Skirted PCR Plates

- Reaction volumes of 5–125 μl (350 μl maximum)
- High-profile (20.75 mm) wells that fit most thermal cyclers, real-time PCR detection systems, and DNA sequencers
- Warp-free half-height skirt for improved robotic handling
- Barcoded plates are available

Hard-Shell Low-Profile 96-Well Semi-Skirted PCR Plates

- Reaction volumes of 5–125 μl (200 μl maximum)
- Low-profile (15.50 mm) wells optimized for low-volume reactions and fast PCR
- Semi-skirted design enables compatibility with Applied Biosystems 7500 fast and ViiA 7 fast instruments
- Footprint and well spacing that match ANSI/SBS standard dimensions
- Barcoded plates are available

*U.S. patents 6,340,589; 6,528,302; and 7,347,977.



Hard-Shell High-Profile 96-Well Semi-Skirted PCR Plate

Hard-Shell 96-Well 480 PCR Plates

Hard-Shell 96-well 480 PCR plates are optimized to work on the Roche LightCycler 480 and 96 systems with a 96-well block. They are designed to withstand the stresses of thermal cycling. Superior stability and flatness is provided via a two-component design. Features include:

- Designed specifically for the Roche LightCycler 480 and 96
- Extremely uniform wells that reduce well-to-well variability in real-time PCR
- Warp-free skirt and deck
- Black alphanumeric labeling for easy well identification
- Footprint and well spacing that match ANSI/SBS standard dimensions
- Barcoded along row A
- 200 μl maximum volume

For More Information

Web: bio-rad.com/96wellpcrplates
Download bulletin: 5496

See Also

PX1 PCR plate sealer: page 407.

Heat sealing films and foils: page 420.

PCR plate seals: page 418.

Ordering Information

Description	Clear Wells	White Wells	Black Wells
Hard-Shell Low-Profile 96-Well Skirted PCR Plates			
White shell, 50 plates	HSP9601	HSP9655	—
Red shell, 50 plates	HSP9611	—	—
Yellow shell, 50 plates	HSP9621	—	—
Blue shell, 50 plates	HSP9631	HSP9635	—
Green shell, 50 plates	HSP9641	HSP9645	—
Black shell, 50 plates	HSP9661	HSP9665	HSP9666
White shell, barcoded, 50 plates	HSP9901	HSP9955	—
White shell, bulk pack of 400 plates	HSP9601B	—	—
Hard-Shell High-Profile 96-Well Semi-Skirted PCR Plates, 25 plates			
Clear shell	HSS9601	—	—
Green shell	HSS9641	—	—
Black shell	—	HSS9665	—
Clear shell, barcoded	HSS9901	—	—
Hard-Shell Low-Profile 96-Well Semi-Skirted PCR Plates, 25 plates			
Clear shell	HSL9601	HSL9605	—
Green shell	HSL9641	HSL9645	—
Clear shell, barcoded	HSL9901	HSL9905	—

Catalog # Description

Hard-Shell 96-Well 480 PCR Plates

HSR9905	Hard-Shell 96-Well 480 PCR Plates , clear shell/white well PCR plate for use with Roche LightCycler 480 real-time PCR system, barcoded, rigid 2-component design, 25 plates
HSR9905K	Hard-Shell 96-Well 480 PCR Plates Kit , for use with Roche LightCycler 480 real-time PCR system, includes 100 barcoded clear shell/white well PCR plates (4 packs of #HSR9905) and 100 Microseal 'C' optical seals (#MSC1001)
HSR9901	Hard-Shell 96-Well 480 PCR Plates , clear shell/clear well PCR plate for use with Roche LightCycler 480 real-time PCR system, barcoded, rigid 2-component design, 25 plates
HSR9901K	Hard-Shell 96-Well 480 PCR Plates Kit , for use with Roche LightCycler 480 real-time PCR system, includes 100 barcoded clear shell/clear well PCR plates (4 packs of #HSR9901) and 100 Microseal 'C' optical seals (#MSC1001)

Multiplate 96-Well PCR Plates

Multiplate High-Profile 96-Well Unskirted PCR Plates

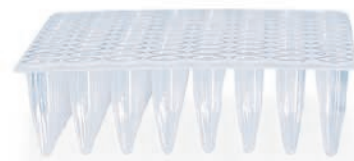
The single-component polypropylene construction of Multiplate PCR plates confers very low protein binding and excellent retention of sample. When less than a full plate is needed, these plates are easily cut with scissors to the required size. The plates are suitable for PCR volumes of 5–125 µl.

Multiplate Low-Profile 96-Well Unskirted PCR Plates

Multiplate low-profile PCR plates combine the unskirted feature of the original Multiplate plate but are 5 mm lower in overall height. The lower height (15.50 mm) reduces the potential for condensation and offers advantages for fast PCR, low-volume reactions, and light capture in fluorescence assays such as real-time PCR. A rigid top surface provides firm handling while still allowing the plate to be cut for use in other formats.

For More Information

Web: bio-rad.com/96wellpcrplates



Multiplate High-Profile 96-Well Unskirted PCR Plate



Multiplate Low-Profile 96-Well Unskirted PCR Plate

Ordering Information

Catalog #	Description
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Multiplate High-Profile 96-Well Unskirted PCR Plates

MLP9601	Multiplate High-Profile 96-Well Unskirted PCR Plates, clear, 25 plates
MLP9651	Multiplate High-Profile 96-Well Unskirted PCR Plates, white, 25 plates
MLP9631	Multiplate High-Profile 96-Well Unskirted PCR Plates, blue, 25 plates

Multiplate Low-Profile 96-Well Unskirted PCR Plates

MLL9601	Multiplate Low-Profile 96-Well Unskirted PCR Plates, clear, 25 plates
MLL9651	Multiplate Low-Profile 96-Well Unskirted PCR Plates, white, 25 plates

iQ High-Profile 96-Well Semi-Skirted Real-Time PCR Plates

These semi-skirted, high-profile PCR plates are optimized for iQ5, iCycler iQ, MyiQ2, and MyiQ real-time PCR detection systems. The semi-skirted design adds stiffness and a labeling surface. Plates are perforated every three columns for easy setup of triplicate reactions.

For More Information

Web: bio-rad.com/96wellpcrplates

**Ordering Information**

Catalog #	Description
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2239441	iQ High-Profile 96-Well Semi-Skirted PCR Plates, 25 plates
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Microseal 96-Well PCR Plates**Microseal High-Profile 96-Well Semi-Skirted PCR Plates**

These PCR plates are designed for Applied Biosystems 0.2 ml tube cyclers, standard real-time PCR systems, and DNA sequencers. They are not recommended for use in Bio-Rad thermal cyclers because the raised ridges around the plate prevent proper sealing in these instruments.

Microseal Low-Profile 96-Well Skirted PCR Plates

These PCR plates feature single-component construction and a skirted design that is suitable for high-throughput plate handling. The robot-friendly design features low-binding polypropylene construction, locator holes, and flat vertical sidewalls for secure handling and easy barcoding. Raised rims around wells provide an excellent surface for tight sealing with a variety of sealing methods and allow easy release of the sealer from the plate. Barcoded plates are also available.

For More Information

Web: bio-rad.com/96wellpcrplates



Microseal High-Profile 96-Well Semi-Skirted PCR Plate



Microseal Low-Profile 96-Well Skirted PCR Plate

Ordering Information

Catalog # Description

Microseal High-Profile 96-Well Semi-Skirted PCR Plates

MSS9601 Microseal High-Profile 96-Well Semi-Skirted PCR Plates, clear, 25 plates

Microseal Low-Profile 96-Well Skirted PCR Plates

MSP9601 Microseal Low-Profile 96-Well Skirted PCR Plates, clear, 50 plates

MSP9605 Microseal Low-Profile 96-Well Skirted PCR Plates, barcoded, clear, 50 plates

Hard-Shell 384-Well Standard PCR Plates

Hard-Shell PCR plates are designed to withstand the stresses of thermal cycling and robotic handling. The patented* two-component design provides superior stability and flatness, allowing precise positioning for automation. Features include:



- Reaction volumes of 1–30 μ l (50 μ l maximum)
- Minimized well-to-well variability that results in extremely uniform results in real-time PCR
- Compatibility with most 384-well thermal cyclers, real-time PCR detection systems, and DNA sequencers
- White-well option for increased fluorescent signal strength
- Color-coded skirts with clear or white wells
- Warp-free skirt and deck for improved robotic handling
- Footprint and well spacing that match ANSI/SBS standard dimensions
- Low-cost, user-readable barcode option

For More Information

Web: bio-rad.com/384wellpcrplates

Download bulletin: 5496

Ordering Information

Description	Clear Wells	White Wells	Black Wells
Hard-Shell 384-Well Standard PCR Plates			
Clear shell, 50 plates	HSP3801	HSP3805	—
Red shell, 50 plates	HSP3811	—	—
Yellow shell, 50 plates	HSP3821	—	—
Blue shell, 50 plates	HSP3831	—	—
Green shell, 50 plates	HSP3841	—	—
Black shell, 50 plates	—	HSP3865	HSP3866
Clear shell, barcoded, 50 plates	HSP3901	HSP3905	—
Clear shell, bulk pack of 500 plates	HSP3801B	—	—

Hard-Shell 384-Well 480 PCR Plates

Hard-Shell 384-well 480 PCR plates are optimized to work on the Roche LightCycler 480 and a range of Bio-Rad and Applied Biosystems instruments. They are designed to withstand the stresses of thermal cycling and robotic handling. The two-component design provides superior stability and flatness. Features include:

- Reaction volumes of 1–30 µl (50 µl maximum)
- Minimized well-to-well variability that results in extremely uniform results in real-time PCR
- Warp-free skirt and deck for improved robotic handling
- Black alphanumeric labeling for easy well identification
- Footprint and well spacing that match ANSI/SBS standard dimensions
- Barcoded at row A and column 24 side; available in clear or white well



For More Information
 Web: bio-rad.com/384wellpcrplates
 Download bulletin: 5496

Ordering Information

Catalog #	Description
HSR4805	Hard-Shell 384-Well 480 PCR Plates , clear shell/white well PCR plate for Roche LightCycler 480 real-time PCR system, barcoded, rigid 2-component design, 50 plates
HSR4805K	Hard-Shell 384-Well 480 PCR Plates Kit , for use with Roche LightCycler 480 real-time PCR system, includes 100 barcoded clear shell/white well PCR plates (2 packs of #HSR4805) and 100 Microseal 'C' optical seals (#MSC1001)
HSR4801	Hard-Shell 384-Well 480 PCR Plates , clear shell/clear well PCR plate for Roche LightCycler 480 real-time PCR system, barcoded, rigid 2-component design, 50 plates
HSR4801K	Hard-Shell 384-Well 480 PCR Plates Kit , for use with Roche LightCycler 480 real-time PCR system, includes 100 barcoded clear shell/clear well PCR plates (2 packs of #HSR4801) and 100 Microseal 'C' optical seals (#MSC1001)

Microseal 384-Well Skirted PCR Plates

Microseal 384-well skirted PCR plates feature single-component construction and are ideal for high-throughput thermal cycling applications.

- Barcoded plates are available
- Footprint and well spacing that match ANSI/SBS standard dimensions

For More Information
 Web: bio-rad.com/384wellplates

Ordering Information

Description	50 Plates	Barcoded, 50 Plates
Microseal 384-Well Skirted PCR Plates		
Clear	MSP3842	MSP3846
White	MSP3852	—
Black	MSP3862	—

* U.S. patents 6,340,589; 6,528,302; and 7,347,977.

PCR Seals

Effective sealing is essential for PCR and qPCR reactions. Besides cap strips (pages 410–411), Bio-Rad offers many sealing options to fit your needs.

PCR Plate Seals

Microseal 'C' Optical Seals

- Optically clear adhesive films designed for tight seals even on wells with raised rims
- Pressure-sensitive adhesive allows easy application during plate sealing
- Designed with superior optical properties for real-time PCR



Microseal 'C' Optical Seals

Microseal 'B' Adhesive Seals, Optically Clear

- Strongest adhesive-based optically clear sealing option designed for real-time PCR plates
- Withstands multiple storage or transport temperatures (–40 to 110°C)

Microseal 'B'
Adhesive Seals

Microseal 'A' Film

- A nonoptical, nonadhesive sealing option for quick pressure-based sealing of plates
- Allows easy removal without the risk of aerosol formation, minimizing cross-contamination
- Convenient option for standard PCR needs



Microseal 'A' Film

Microseal 'F' Foil

- Aluminum foil allows opaque sealing option for DNA sequencing (ABI 3700 DNA analyzer) and sample storage
- Acts as a barrier against evaporation in extreme temperatures (–80 to 105°C)
- Pierceable foil for easy sample retrieval



Microseal 'F' Foil

96-Well PCR Plate Sealing Mats

These reusable mats are convenient for sealing 96-well PCR plates; they are not suitable for qPCR.

Pressure Pad

This foam pad with magnet distributes lid pressure uniformly over sealing film on plates used in thermal cyclers.

Optical Compression Pad (96-well)

This compression pad enhances the seal integrity of Microseal 'B' clear seals when used in real-time PCR detection systems.

Optical Film Sealing Kit

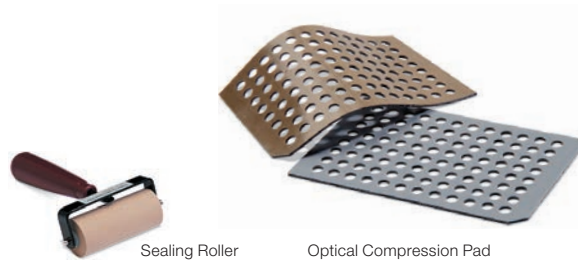
The sealing kits contain 100 Microseal 'B' clear seals and an optical compression pad.

For More Information

Web: bio-rad.com/pcrseals



96-Well PCR Plate Sealing Mat



Sealing Roller

Optical Compression Pad

Ordering Information

Catalog #	Description
MSC1001	Microseal 'C' Optical Seals , 100 pressure-sensitive adhesive seals
MSA5001	Microseal 'A' Film , 50 seals
MSB1001	Microseal 'B' Adhesive Seals , 100 optically clear seals
MSF1001	Microseal 'F' Foil , 100 adhesive seals
MSR0001	Sealing Roller , for sealing PCR plates with films
ADR3296	Optical Compression Pad , for improved film sealing of 96-well plates in DNA Engine Opticon 2 and Chromo4 systems
ADR5001	Pressure Pad , uniformly distributes lid pressure for sealing film
MSO1001	Optical Film Sealing Kit , for 96-well plates, includes optical compression pad, 100 Microseal 'B' clear adhesive seals
2239442	96-Well PCR Plate Sealing Mats , 5

See Also

PX1 PCR plate sealer: page 407.

PCR plates: page 412.

Heat Sealing Films and Foils

Bio-Rad offers a family of heat sealing films and foils for use with the PX1 PCR plate sealer. These sealing solutions help deliver consistent and reliable data by minimizing sample evaporation during thermal cycling.

For More Information

Web: bio-rad.com/heatseals

Request or download bulletin: 6257

Optically Clear Heat Seals

These clear polymer films provide a secure sealing option for PCR and real-time PCR applications. The seals are peelable pre- and post-cycling, allowing easy sample retrieval when desired. Features include:

- High light transmission, ideal for optical assays
- Low level of autofluorescence to minimize interference with qPCR detection
- Clear film enables easy inspection of sample wells
- Seal integrity from -80 to 110°C

Permanent Clear Heat Seal

These seals provide the strongest heat sealing option and are ideal when seals will not be removed. These seals are recommended for water bath cycling. Features include:

- Strong permanent adhesive can withstand water bath cycling
- Clear film enables easy inspection of sample wells
- High solvent resistance
- Seal integrity from -80 to 110°C

Pierceable Foil Heat Seal

This seal provides a secure sealing option for standard PCR and Droplet Digital PCR (ddPCR) applications. This pierceable foil film enables sample retrieval from select wells. Plates with pierced seals can be resealed with another pierceable foil heat seal. Features include:

- Compatible with Droplet Digital PCR as validated using the QX200 ddPCR system workflow
- High solvent resistance
- Colored stripe clearly identifies sealing surface
- Seal integrity from -20 to 110°C

Peelable Foil Heat Seal

The peelable foil heat seal is ideal for sample storage. This seal can be easily peeled from PCR plates stored in a -80°C freezer or in liquid nitrogen. This seal is also validated for sealing PCR plates. Features include:

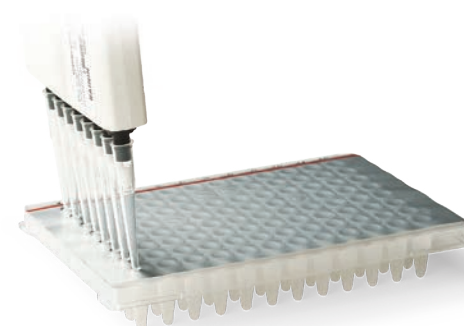
- Forms a peel-away seal
- Moderate solvent resistance
- Seal integrity from -200 to 110°C



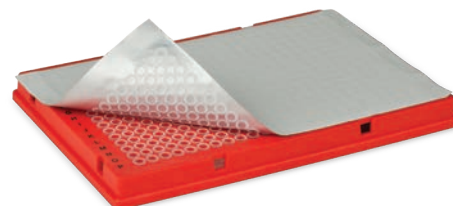
Optically Clear Heat Seal



Permanent Clear Heat Seal



Pierceable Foil Heat Seal



Peelable Foil Heat Seal

For More Information

Web: bio-rad.com/heatseals

Request or download bulletin: 6257

Ordering Information

Catalog #	Description
1814030	Optically Clear Heat Seal , package of 100
1814035	Permanent Clear Heat Seal , package of 100
1814040	Pierceable Foil Heat Seal , package of 100
1814045	Peelable Foil Heat Seal , package of 100

Sealing Pads for Automation

Microseal 'P' and 'P+' Sealing Pads

These reusable sealing pads are designed to adhere to a motorized heated lid. Use 'P' pads with Power Bonnet lids, and 'P+' pads with Moto Alpha units. Microseal 'P+' pads provide improved sealing of low-volume reactions — as low as 5 µl in 96-well plates and 1 µl in 384-well plates. Each pad may be used for approximately 25 runs.

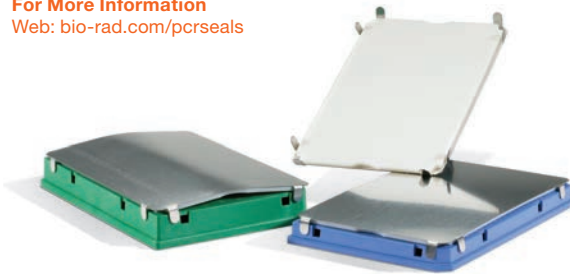


Microseal 'P+' Sealing Pad

Auto-Sealing Lids for PCR Plates

These lids are reusable, automation-friendly sealers that prevent evaporation and contamination during reaction assembly and seal tightly for thermal cycling when the cyclers lid is closed. They can be reused up to 50 times. The lids are constructed of metal with an attached compressible pad. Two varieties are available: a self-releasing arched lid and an arched lid with wide tabs for robotic grippers.

For More Information
 Web: bio-rad.com/pcrseals



Auto-Sealing Lids

Ordering Information

Catalog #	Description
Microseal 'P' and 'P+' Pads	
MSP1001	Microseal 'P' Pads , reusable, for Power Bonnet lids, 10
MSP1002	Microseal 'P+' Pads , reusable, for Moto Alpha unit lids, 10
MSP1003	Microseal 'P' Replacement Pads , for MSL2032, reusable, 10
Auto-Sealing Lids for PCR Plates	
MSL2022	Arched Auto-Sealing PCR Plate Lids , reusable, 4
MSL2032	Arched Auto-Sealing PCR Plate Lids with Wide Tabs , reusable, 4

Chill-out Liquid Wax

Chill-out liquid wax provides an excellent vapor barrier that may be used instead of mineral oil in thermal cyclers without heated lids. After cycling, the tubes are chilled below 10°C to harden the wax. The solid layer protects samples from spills or aerosol formation but is easy to penetrate with a pipet tip for sample retrieval. Chill-out liquid wax is available in a clear formulation for use in fluorescence assays, such as those performed in real-time PCR, and in a bright red formulation, easily visible when recovering reaction products (not recommended for sealing Microseal 384-well PCR plates).



For More Information

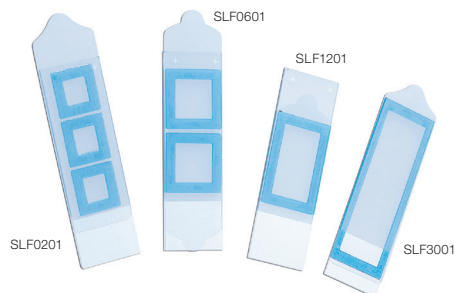
Web: bio-rad.com/pcrseals

Ordering Information

Catalog #	Description
CHO1401	Chill-out Liquid Wax , red, 100 ml
CHO1404	Chill-out Liquid Wax , red, 1 L
CHO1411	Chill-out Liquid Wax , clear, optical grade, 100 ml
CHO1414	Chill-out Liquid Wax , clear, optical grade, 1 L

Frame-Seal Incubation Chambers

Frame-Seal incubation chambers are easy-to-use, strongly adhesive hybridization chambers with flexible plastic coverslips. They provide vapor-tight sealing for FISH, colonies, in situ PCR, and PRINS and allow samples to be recovered easily. The seal withstands temperatures up to 97°C. Frame-Seal chambers should be used with plain (unprinted) glass slides. Slides with highly hydrophobic ink patterns are not recommended for use with Frame-Seal chambers. They are UV-treatable for inactivation of contaminating DNA.



For More Information

Web: bio-rad.com/pcrseals

Ordering Information

Catalog #	Description
SLF0201	Frame-Seal Incubation Chambers , 9 x 9 mm, 25 µl capacity, coverslips included, 100
SLF0601	Frame-Seal Incubation Chambers , 15 x 15 mm, 65 µl capacity, coverslips included, 100
SLF1201	Frame-Seal Incubation Chambers , 17 x 28 mm, 125 µl capacity, coverslips included, 100
SLF3001	Frame-Seal Incubation Chambers , 19 x 60 mm, 300 µl capacity, coverslips included, 100

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Plastic Consumables

For liquid-handling applications, Bio-Rad offers pipets, pipet tips, reagent reservoirs, 96-well EIA plates, and tubes.

Pipets

A full set of high-precision micropipets is available for all your liquid handling needs.

Micropipets and Accessories

Professional Micropipets

These adjustable-volume digital pipets deliver exceptional performance and are guaranteed to function efficiently and reliably for years. Micropipets are available in five volume ranges: 0.1–2.0, 0.5–10, 2–20, 20–200, and 100–1,000 μl .

Micropipet features include:

- Adjustable digital dial with volume lock
- Improved ergonomic handle and tip ejector
- Accommodation of standard pipet tips and serological pipets
- 3-year warranty*
- Fully autoclavable*

* Except pipet controller.

8-Channel Professional Micropipet

These multichannel micropipets are ideal for use with standard 96-well formats. They have an adjustable working volume range of 5–50 μl or 20–200 μl . A volume lock feature will prevent any accidental volume changes. Along with its ergonomic handle for right- and left-hand use, the manifold can rotate 360° for added pipetting comfort. A curved ejector design pushes tips off in a single step with minimal applied force.

Each channel has an independent precision piston assembly to ensure accuracy and reproducibility from one pipetting series to the next as well as between channels. Each pipet has been tested and supplied with a certificate of quality and a calibration key. The multichannel pipet is fully autoclavable.

Professional Pipet Controller

This lightweight, ergonomic, cordless pipet controller can be used with all plastic or glass pipets between 0.1 and 100 ml. Single-hand operation is easy with two-button speed control for aspirating and dispensing. A large LCD display clearly indicates battery status, pipet mode, and pipet speed. The unit comes with a bench stand, wall mount, charger, and 0.45 μm filter.

For More Information

Web: bio-rad.com/micropipets



Professional Micropipets

Professional Micropipet Specifications

	Volume Range, μl	Channels	Adjustable-Volume Increments, μl
P2	0.1–2.0	1	0.002
P10	0.5–10	1	0.02
P20	2–20	1	0.02
P200	20–200	1	0.2
P1000	100–1,000	1	2.0
8-channel, P50	5–50	8	0.2
8-channel, P200	20–200	8	0.2



8-Channel Professional Micropipet



Pipet Controller

Professional Micropipet Set with Backpack

The professional micropipet set with backpack is a ready-to-go, complete set for those who need to start up a new lab or refresh lab equipment to meet their pipetting needs. This set comes with four professional micropipets (0.5–10, 2–20, 20–200, and 100–1,000 μl), a round carousel pipet rack that can hold up to six single-channel micropipets, four racks of Bio-Rad pipet tips (TBR-14, -35, -40, and Prot/Elec) for general lab use, and a Bio-Rad backpack.

Carousel Pipet Rack

This round benchtop pipet rack holds up to six single-channel pipets.



Professional Micropipet Set with Backpack

Ordering Information

Catalog #	Description
1660499	Professional Micropipet , adjustable volume, 0.1–2.0 μl
1660505	Professional Micropipet , adjustable volume, 0.5–10 μl
1660506	Professional Micropipet , adjustable volume, 2–20 μl
1660507	Professional Micropipet , adjustable volume, 20–200 μl
1660508	Professional Micropipet , adjustable volume, 100–1,000 μl
1660496	Professional Micropipet , 8-channel, adjustable volume, 5–50 μl
1660495	Professional Micropipet , 8-channel, adjustable volume, 20–200 μl
1660486	Professional Micropipet Set with Backpack , set includes 4 professional series micropipets: P10, P20, P200, P1000, carousel pipet rack, 4 racks of pipet tips (TBR-14, -35, -40, Prot/Elec), and Bio-Rad backpack
1660490	Professional Pipet Controller , 120 V, 0.1–100 ml, includes bench stand, charger, wall mount, 0.45 μm filter
1660491	Professional Pipet Controller , 220 V, 0.1–100 ml, includes bench stand, charger, wall mount, 0.45 μm filter
1660487	Carousel Pipet Rack , holds 6 single-channel micropipets

Pipet Tips

Bio-Rad's pipet tips are made from virgin polypropylene and have been accurately molded for an airtight fit. The tips are guaranteed to have a smooth interior surface, which is essential for precision pipetting.

- Tips and racks are autoclavable at 120°C at 15 lb of pressure for 15 min; tips presterilized by e-beam irradiation are also available
- All materials used in both clear and colored pipet tips have been formulated without heavy metals
- Xcluda pipet tips have been independently tested and certified to be free of DNase, RNase, and pyrogens
- Pipet tip racks are manufactured from polypropylene, with a plastic content code of 5, and are free of labels for convenient recycling

Tip Selection Guide

Pipet Type	Tip Type	Pipet Type	Tip Type
Bio-Rad Professional		Oxford Benchmate	
0.1–2.0 µl	Xcluda A, Seque/Pro, BR-14, TBR-14	0.5–10 µl	Seque/Pro, Xcluda A, 14
0.5–10 µl	Xcluda A, Seque/Pro, BR-31, TBR-14	10–50 µl	Xcluda J, 35, 37–39
2–20 µl	Xcluda B, Prot/Elec, BR-35, TBR-35	40–200 µl	Prot/Elec, Xcluda C, D, G, 35, 37–39
20–200 µl	Xcluda D, Prot/Elec, MTP-26, -35, -37, -38, MTP-28-S, BR-35, -37, -38, -39, TBR-35	200–1,000 µl	Xcluda E
100–1,000 µl	Xcluda H, BR-40, 41, TBR-40, -41	Rainin Pipetman and EDP Series	
Costar (8-Pette, 12-Pette)		0.1–10 µl	Seque/Pro, Xcluda F, 31
20–200 µl	28	2–20 µl	Prot/Elec, Seque/Pro, Xcluda B, 31, 35, 37–39
25–200 µl	28	10–100 µl	Prot/Elec, Xcluda C and G, 35, 37–39
Eppendorf		20–200 µl	Prot/Elec, Xcluda D, 35, 37–39
0.5–10 µl	Seque/Pro, Xcluda F, 31	100–1,000 µl	Xcluda E, 40, 41
2–20 µl	Prot/Elec, Xcluda B, 14, 35, 37–39	Socorex	
10–100 µl	Prot/Elec, Xcluda C and G, 35, 37–39	0.5–10 µl	Seque/Pro
50–250 µl	39, 40, 41	1–200 µl	Prot/Elec, 35, 37–39
100–1,000 µl	Xcluda H, 41	200–1,000 µl	40, 41
Excalibur		Titertek Flow	
1–200 µl	Prot/Elec, 35, 37–39	5–200 µl	26
200–1,000 µl	40, 41	5–300 µl	Xcluda D
Thermo Labsystems Finnpipette		Volac	
5–40 µl	Prot/Elec, Xcluda B, C, G, 35, 37–39	1–20 µl	Prot/Elec, 31, 35, 37–39
40–200 µl	Prot/Elec, Xcluda C and G, 35, 37–39	1–200 µl	Prot/Elec, 35, 37–39
200–1,000 µl	Xcluda E	200–1,000 µl	40, 41

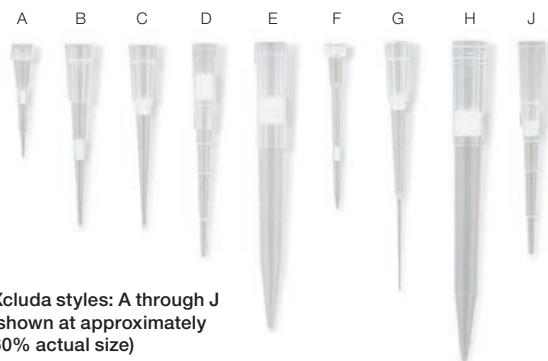
See Also

Thermal cyclers for PCR: page 370.
Real-time PCR systems: page 375.

Xcluda Aerosol Barrier Pipet Tips

Xcluda aerosol barrier pipet tips guard against aerosol contamination of samples, a feature of particular importance in PCR experiments. The barrier will not seal on contact with liquid, which protects samples from accidental loss, if unintentional overpipetting occurs. Offered in nine different styles, the tips fit a variety of pipets. They are available presterilized in fully enclosed racks and are independently tested and certified to be free of DNase, RNase, and pyrogens.

For More Information
Web: bio-rad.com/xcluda



Xcluda styles: A through J (shown at approximately 60% actual size)

Ordering Information

Catalog #	Description
2112001	Xcluda Style A , 0.5–10 µl, 960
2112006	Xcluda Style B , 2–20 µl, 960
2112011	Xcluda Style C , 10–100 µl, 960
2112016	Xcluda Style D , 20–200 µl, 960
2112021	Xcluda Style E , 100–1,000 µl, 960
2112026	Xcluda Style F , 0.5–10 µl, 1,000
2112031	Xcluda Style G , 10–100 µl, 1,000
2112036	Xcluda Style H , 100–1,000 µl, 1,000
2112041	Xcluda Style J , 10–100 µl, 960
1660491	Professional Pipet Controller , 220 V, 0.1–100 ml, includes bench stand, charger, wall mount, 0.45 µm filter
1660492	Professional Pipet Controller , 220 V for Australia, 0.1–100 ml, includes bench stand, charger, wall mount, 0.45 µm filter
1660487	Carousel Pipet Rack , holds 6 single-channel micropipets

Pipet Tips for Gel Loading

Seque/Pro Capillary Pipet Tips

Seque/Pro capillary pipet tips have an average OD of <0.3 mm, making them ideal for loading sequencing gels or IEF tube gels. Seque/Pro tips perform best when used with Eppendorf ultra micropipets (0.5–10 µl) and can also be used with Rainin Pipetman 10 and 20 µl pipets.



Prot/Elec Pipet Tips

Prot/Elec tips fit easily within a gap of 0.75 mm between vertical slab gel plates while maintaining a large bore for fast sample flow. The 200 µl capacity tips are molded to fit Rainin Pipetman 20, 100, and 200 pipets and Eppendorf 20 and 100 µl pipets. Prot/Elec tips are also available with an aerosol barrier to guard against airborne contaminants and cross-contamination of samples (see Xcluda style G).



For More Information
 Web: bio-rad.com/gelloading
 Download bulletin: 5676

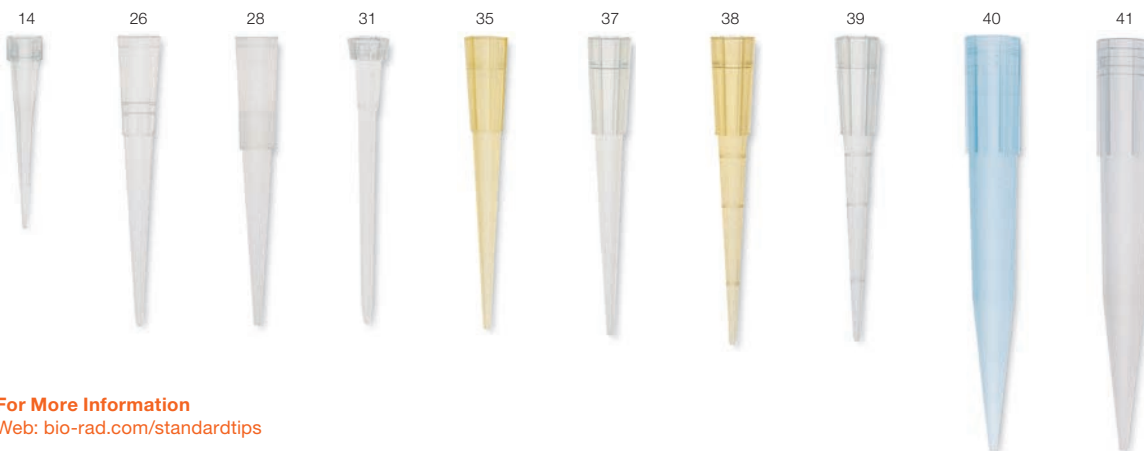
See Also

Vertical electrophoresis systems: page 194.

Ordering Information

Catalog #	Description
2239911	Seque/Pro Capillary Pipet Tips , in enclosed autoclavable rack, 0.5–10 µl, 200
2239912	Seque/Pro Capillary Pipet Tips , sterilized in enclosed rack, 0.5–10 µl, 200
2239915	Prot/Elec Pipet Tips , bulk pack, plastic bag in dust-free box, 1–200 µl, 1,000
2239917	Prot/Elec Pipet Tips , racked, 12 x 17 format, 204 per rack with a cover on each rack, 1–200 µl, 1,020
2239916	Prot/Elec Pipet Tips , racked, 8 x 12 format, 96 per rack with a cover on each rack, 1–200 µl, 960

Standard Pipet Tips



For More Information
 Web: bio-rad.com/standardtips

See Also

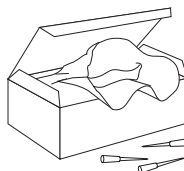
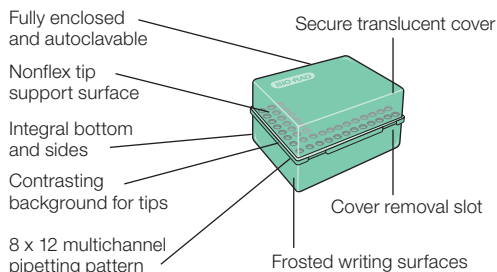
PCR tubes: page 410.

Tip Packaging Options

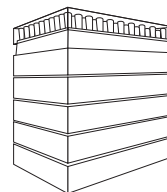
Packaging Option	Standard Tip Type Number									
	14	26	28	31	35	37	38	39	40	41
BR	•		•	•	•	•	•	•	•	•
RBR					•					
TBR	•				•				•	•
MTP		•			•	•	•			
MTP-S (sterilized)			•		•	•	•			

MTP

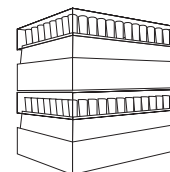
8 x 12 format, enclosed, nonflex racks are suitable for repeated reloading and autoclaving. Racked tips are also available presterilized.



BR
Bulk tips, plastic bag in a dust-free box.



RBR
Racked tips, one cover on a stack of nested racks.



TBR
Ideal for autoclaving, each rack has its own lid and covered bottom for full enclosure.

Ordering Information

Catalog #	Description
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MTP 8 x 12 Format, Enclosed Racks

2239301	MTP-26 Tips, clear, 5–200 µl, 960
2239303	MTP-35 Tips, yellow, 1–200 µl, 960
2239304	MTP-37 Tips, clear, 1–200 µl, 960
2239313	MTP-38 Tips, yellow, graduated, beveled, 1–200 µl, 960

MTP-S 8 x 12 Format, Enclosed Racks, Presterilized*

2239307	MTP-28-S Tips, clear, 25–200 µl, 960
2239308	MTP-35-S Tips, yellow, 1–200 µl, 960
2239309	MTP-37-S Tips, clear, 1–200 µl, 960
2239318	MTP-38-S Tips, yellow, graduated, beveled, 1–200 µl, 960

BR Bulk Tips

2239014	BR-14 Tips, clear, 0.1–10 µl, 1,000
2239028	BR-28 Tips, clear, 25–200 µl, 1,000
2239031	BR-31 Tips, clear, 0.5–10 µl, 1,000
2239035	BR-35 Tips, yellow, 1–200 µl, 1,000
2239037	BR-37 Tips, clear, 1–200 µl, 1,000
2239038	BR-38 Tips, yellow, graduated, beveled, 1–200 µl, 1,000
2239039	BR-39 Tips, clear, graduated, beveled, 1–200 µl, 1,000
2239040	BR-40 Tips, blue, 100–1,000 µl, 500
2239041	BR-41 Tips, clear, 100–1,000 µl, 500

RBR Racked Tips, One Cover on Nested Racks

2239135	RBR-35 Tips, yellow, 1–200 µl, 1,000
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TBR Racked Tips, Cover on Each Rack

2239354	TBR-14 Tips, clear, 0.1–10 µl, 1,000
2239347	TBR-35 Tips, yellow, 1–200 µl, 1,000
2239350	TBR-40 Tips, blue, 100–1,000 µl, 1,000
2239351	TBR-41 Tips, clear, 100–1,000 µl, 1,000

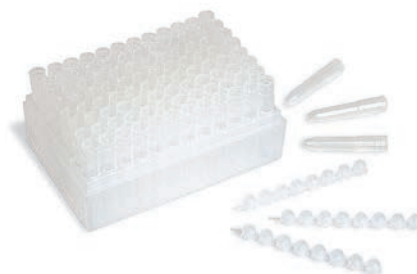
* Presterilized racks and polyethylene plugs are not suitable for autoclaving. Order unsterilized racks to reload tubes and autoclave.

Micro Test Tubes

Titertube Micro Test Tubes

Tubes and racks are made of polypropylene; they are autoclavable to 120°C and freezable to –80°C. The polyethylene plugs, which seal tightly for storage, are not designed for repeated use and cannot be autoclaved. The tubes are offered in sterile and unsterilized strips of eight, which may be cut to separate the tubes. Titertube micro test tubes have:

- 1 ml capacity, 8.8 x 45 mm
- Spacing that matches 96-well plates
- Enclosed racks that stack to store 5,800 samples/ft³
- Racks with a grid for identification of contents



For More Information
Web: bio-rad.com/titertube

Ordering Information

Catalog #	Description
2239390	Titertube Micro Test Tubes , unsterilized, 10 racks of 96 tubes
2239395*	Titertube Micro Test Tubes , presterilized, 10 racks of 96 tubes
2239391	Titertube Micro Test Tubes , unsterilized, bulk, 1,000
2239393	Titertube Plugs , unsterilized, 960 in 120 strips of 8
2239392*	Titertube Plugs , presterilized, 960 in 120 strips of 8
2239394	Titertube Rack , empty, holds 96 Titertube micro test tubes, 10

* Presterilized racks and polyethylene plugs are not suitable for autoclaving. Order unsterilized racks to reload tubes and autoclave.

EZ Micro and Standard Micro Test Tubes

EZ Micro graduated polypropylene test tubes have a frosted marking area and a flat top that is pierceable by a 19 gauge or thicker needle. Standard polypropylene micro test tubes are recommended for solvent extraction and heating when a very tight cap seal is required. Because of their tighter cap fit, standard tubes may be more difficult to manipulate in applications that require repeated opening and closing of the tubes. Separate polyethylene caps for the 1.5 ml capless tubes have a knurled top for easy handling.

For More Information
Web: bio-rad.com/ezmicro
Download bulletin: 5676

The micro test tubes are:

- Suitable for general-purpose benchtop centrifuge use; sturdy uniform walls easily withstand up to 13,000 x g
- Autoclavable* to 120°C; freezable to –80°C
- Available in 2 ml, 1.5 ml, and 500 µl sizes



* 1.5 ml colored microcentrifuge tubes are not autoclavable.



500 µl EZ Micro



1.5 ml EZ Micro



2 ml EZ Micro



1.5 ml Standard



1.5 ml Capless

Ordering Information

Catalog #	Description
2239503	EZ Micro Test Tubes , 500 µl, clear, 1,000
2239480	EZ Micro Test Tubes , 1.5 ml, clear, 500
2239430*	EZ Micro Test Tubes , 2 ml, clear, 500
2239501	Micro Test Tubes , standard, 1.5 ml, clear, 500
2239500	Micro Test Tubes , capless, 1.5 ml, polypropylene, clear, graduated, 500
2239490	Separate Caps , for capless micro test tubes, white, 1,000
1660473	Colored Microcentrifuge Tubes , 1.5 ml, 6 colors, 600

* To fit centrifuges, 2 ml tubes have thinner walls than standard tubes and are intended for short runs at less than 13,000 x g. Heavy samples, high g forces, long runs, or centrifuges that radiate excessive heat may damage these tubes.

Screwcap Micro Test Tubes

Screwcap micro test tubes and caps are made of polypropylene. O-rings are made of a blend of polyethylene and polypropylene. Features include:

- O-ring operating range from -55 to 150°C
- Uniform walls for uniform heat transfer
- Conical bottoms for pellet collection
- Knurled caps for easy handling

For More Information

Web: bio-rad.com/screwcap

Download bulletin: [5676](#)



0.5 ml Conical 0.5 ml Skirted 1.5 ml Conical 2.0 ml Skirted Screwcap

Ordering Information

Catalog #	Description
2240165	0.5 ml Conical Tubes , with installed O-ring screwcaps, sterilized, 500
2240185	0.5 ml Skirted Tubes , with installed O-ring screwcaps, sterilized, 500
2240100	1.5 ml Conical Tubes , with separate O-ring screwcaps, unsterilized, 500
2240110	1.5 ml Conical Tubes , with installed O-ring screwcaps, sterilized, 500
2240130	2.0 ml Skirted Tubes , with separate O-ring screwcaps, unsterilized, 500
2240140	2.0 ml Skirted Tubes , with installed O-ring screwcaps, sterilized, 500

Reservoirs, EIA Plates, and Additional Plastic Products

Reagent Reservoirs

Disposable reagent reservoirs are presterilized and compatible with multichannel pipets. Their sloping design enables effective liquid pickup. The 50 ml capacity is graduated to 25 ml in 5 ml increments.

For More Information

Web: bio-rad.com/reagentreservoirs



Reagent Reservoir

See Also

PCR tubes:
page 410.

ELISA reagents:
page 338.

Microplate readers:
page 336.

Ordering Information

Catalog #	Description
2244872	Sterilized Reagent Reservoirs , graduated, polystyrene, 5 per package, box of 200

96-Well EIA Plates

For EIAs, ELISAs, and other protein-binding assays, use the Costar 96-well flat bottom EIA plate. This plate binds more protein more uniformly than any other plate.

For More Information

Web: bio-rad.com/EIAPlates

Costar 96-Well
Flat Bottom EIA Plate



Ordering Information

Catalog #	Description
2240096	Costar 96-Well Flat Bottom EIA Plates , polystyrene, 5 per package, box of 100

See Also

Cuvettes:
page 23.

Tube Racks and Storage Boxes

Bio-Rad plastic racks and storage units provide the ultimate in ease of storage and sample organization.

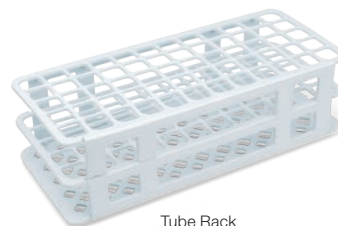
Racks and Storage Box Selection Guide

	Capacity	Dimensions (W x D x H)
Green racks	80 x 1.5/2.0 ml tubes	6.1 x 23.1 x 2.7 cm
Tube racks	60 x 15 ml 24 x 50 ml	10.5 x 24.6 x 7.2 cm 11.0 x 30.0 x 8.5 cm
Storage boxes	100 x 1.5/2.0 ml tubes	14.2 x 14.2 x 5.5 cm

For More Information
Web: bio-rad.com/racks



Storage Boxes and Green Rack



Tube Rack

Ordering Information

Catalog #	Description
1660481	Green Racks , hold 80 x 1.5/2.0 ml tubes, set of 5
1660483	Tube Racks , hold 60 x 15 ml tubes, set of 5
1660484	Tube Racks , hold 24 x 50 ml tubes, set of 5
1660482	Storage Boxes , hold 100 x 1.5/2.0 ml tubes, set of 5, multicolored

Additional Plastic Consumables

Bio-Rad now offers a wide selection of disposable plastic components for your everyday cell/bacterial culturing uses in the lab.

- **Petri dishes** – ready-to-use polystyrene cell and bacterial culture petri dishes, 60 mm diameter, sterile
- **Gel staining trays** – disposable plastic trays ideal for staining mini gels
- **Inoculation loops** – the loops are smooth and flexible, making it easy to achieve uniform and smooth streaking without damaging the agar surface. Using disposable inoculation loops eliminates the risk of cross-contamination due to improper sterilization and the loops do not need flaming, which reduces fire hazards in the laboratory; 10 µl, sterile
- **Jellyfish foam floating racks** – hold up to 12 microcentrifuge tubes, for use in cold and hot water baths
- **Disposable plastic transfer pipets** – polyethylene plastic pipet bulbs for liquid handling needs; sterile and nonsterile pipets are available
- **Conical centrifuge tubes** – 15 ml polypropylene conical tubes with volume graduations and screw caps
- **Cell culture tubes** – round bottom snap cap culture tube, 14 ml, sterile



Gel Staining Trays



Petri Dishes



15 ml Conical Centrifuge Tubes



Jellyfish Foam Floating Rack



Disposable Plastic Transfer Pipets



Inoculation Loops



Cell Culture Tubes

Ordering Information

Catalog #	Description
1660476	Cell Culture Tubes , 17 x 100 mm, 14 ml, sterile, 25
1660475	Conical Centrifuge Tubes , 15 ml, 50
1660470	Petri Dishes , 60 mm diameter, sterile, 500
1660471	Inoculation Loops , 10 µl, sterile, 80
1660474	Disposable Plastic Transfer Pipets , sterile, 1 ml, graduated, 500
1660480	Disposable Plastic Transfer Pipets , nonsterile, 1 ml, graduated, 500
1660477	Gel Staining Trays , 4
1660479	Jellyfish Foam Floating Racks , 8

General Laboratory Equipment

See Also

UView 6x loading dye and stain: page 273.

UView Mini Transilluminator

Visualize your gel using the compact UView mini transilluminator.

For More Information
 Web: bio-rad.com/uview



Ordering Information

Catalog #	Description
1660531	UView Mini Transilluminator

Centrifuges

- **Mini centrifuge** — includes microtube and PCR strip tube rotors and 0.5/0.6 ml, 0.4/0.25 ml, and 0.2 ml tube adaptors; the maximum speed is 6,000 rpm (2,000 x g). Includes power adaptor for U.S./Canada, EU, UK, and Australia
- **Model 16K microcentrifuge** — accommodates 1.5 or 2.0 ml tubes and has a quick-spin feature; the maximum speed is 14,000 rpm (16,000 x g). Safe for coldroom operation
- **PCR tube adaptor for model 16K microcentrifuge** — holds two PCR 8-tube strips or 16 individual 0.2 ml tubes

For More Information
 Web: bio-rad.com/centrifuges



Model 16K Microcentrifuge
 (PCR tube adaptor sold separately)

Mini Centrifuge
 (includes PCR tube adaptor)

Ordering Information

Catalog #	Description
12011919	Mini Centrifuge , 100–240 V
1660602	Model 16K Microcentrifuge , 120 V
1660612	Model 16K Microcentrifuge , 220 V
1660620	PCR Tube Adaptor , for model 16K microcentrifuge

Mixing Devices

- **Mini rocker** — provides superior three-dimensional mixing action; gentle yet thorough rocking makes it ideal to use for western blot incubations and gel staining. Compact footprint requires minimal benchspace and enables it to fit inside our mini incubation oven
- **Tube roller** — allows mixing of samples both horizontally and vertically. The compact design enables it to fit inside our mini incubation oven, making it ideal for mixing liquids while incubating. Comes with three interchangeable tube rotisseries to accommodate tubes from 1.5–50 ml. Compact footprint requires minimal benchspace
- **BR-2000 vortexer** — a general-purpose vortex mixer; a flathead dimpled adaptor is also available
- **UltraRocker rocking platform** — dual-platform rocker that can be used for staining and destaining gels and blots, Southern hybridization, and overnight incubation



Mini Rocker



Tube Roller



BR-2000 Vortexer
(flathead dimpled adaptor
sold separately)



UltraRocker Rocking Platform

For More Information

Web: bio-rad.com/mixingdevices

Ordering Information

Catalog #	Description
1660710	Mini Rocker , 120 V, includes two blotting boxes
1660720	Mini Rocker , 230 V (EU/UK), includes two blotting boxes
1660711	Tube Roller , 120 V, includes 3 tube carousels for 1.5, 15, and 50 ml tubes
1660721	Tube Roller , 230 V, includes 3 tube carousels for 1.5, 15, and 50 ml tubes
1660722	Tube Roller , 230 V (UK), includes 3 tube carousels for 1.5, 15, and 50 ml tubes
1660610	BR-2000 Vortexer , 120 V
1660611	BR-2000 Vortexer , 230 V
1660621	BR-2000 Vortexer , 230 V (UK)
1660622	Flathead Dimpled Adaptor , for BR-2000 vortexer
1660709	UltraRocker Rocking Platform , 120 V
1660719	UltraRocker Rocking Platform , 230 V

See Also

Micro test tubes:
page 431.
PCR tubes:
page 410.

Temperature Control Equipment

- **Benchtop shaking incubator** — handles small batch culture needs easily, for example, growing bacteria or yeast up to 4 L. The incubation temperature can be set in 0.1° increments up to 65°C. The shaker speed is adjustable between 20 and 300 rpm for periods up to 99 hours or continuous operation. It features outstanding temperature uniformity and stability. Secure a wide variety of vessels with many available accessories
- **Digital dry bath** — digitally controlled dry bath that is ideal for a multitude of laboratory procedures where incubation of samples is needed. It is accurate, built for safe continuous operation, economical, and versatile. Comes with one aluminum alloy 1.5 ml heating block (24 x 1.5 ml capacity). Additional 0.5, 2.0, and 15 ml heating blocks with 24 x 0.5, 24 x 2.0, and 12 x 15 ml capacity, respectively, can be purchased separately; 15 ml dry bath block not shown
- **Mini incubation oven** — can accommodate up to eighty 6.5 cm plates and operates at temperatures up to 60°C. Contains a rear port to allow insertion of our tube roller or mini rocker for temperature-controlled mixing
- **Water bath** — temperature controlled, dependable, affordable water bath that includes stainless steel tank and lid, electrostatically applied finish that resists rust, corrosion, and scratches, over-temperature protection, and thermometer



Benchtop Shaking Incubator



Digital Dry Bath



0.5 ml Dry Bath Block



2.0 ml Dry Bath Block



Mini Incubation Oven



Water Bath

For More Information

Web: bio-rad.com/tempcontrol

Ordering Information

Catalog #	Description
17002944	Benchtop Shaking Incubator Starter Set , 120 V, includes 6 flask clamps
17002945	Benchtop Shaking Incubator Expanded Set , 120 V, includes 34 flask clamps and 1 petri dish shelf
17002946	Benchtop Shaking Incubator Starter Set , 230 V (EU/UK), includes 6 flask clamps
17002947	Benchtop Shaking Incubator Expanded Set , 230 V (EU/UK), includes 34 flask clamps and 1 petri dish shelf
1660562	Digital Dry Bath , 120 V, includes 1.5 ml heating block
1660563	Digital Dry Bath , 230 V (EU/UK), includes 1.5 ml heating block
1660565	Digital Dry Bath Heating Block, 0.5 ml , for 24 x 0.5 ml tubes
1660566	Digital Dry Bath Heating Block, 2.0 ml , for 24 x 2.0 ml tubes
1660567	Digital Dry Bath Heating Block, 15 ml , for 12 x 15 ml tubes
1660501	Mini Incubation Oven , 120 V
1660521	Mini Incubation Oven , 230 V
1660504	Temperature-Controlled Water Bath , 120 V
1660524	Temperature-Controlled Water Bath , 230 V
1660712	Mini Incubation Oven and Mini Rocker , 120 V
1660713	Mini Incubation Oven and Tube Roller , 120 V
1660570	Digital Dry Bath Heating Blocks , 3 pack, 0.5, 2.0, and 15 ml blocks
1660571	Digital Dry Bath with 4 heating Blocks , 115 V, includes 0.5, 1.5, 2.0, and 15 ml blocks, for the U.K. and Europe,
1660572	Digital Dry Bath with 4 Heating Blocks , 230 V, includes 0.5, 1.5, 2.0, and 15 ml blocks

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Hands-On Inquiry-Based Science Education

Do You Have Teaching Responsibilities?

The Bio-Rad Explorer program makes it easy for educators to meet AAAS and NSF's goals for Vision and Change in Undergraduate Biology Education. The program provides kits, a textbook, and modular lab series that bring project-based learning and research skills into the classroom. Meet the challenge to:

- Integrate core concepts and competencies throughout your curriculum
- Focus on student-centered and project-based learning
- Engage the biology community in the implementation of change

For more information about the products listed here, request the current Bio-Rad Explorer catalog (bulletin 2112) or visit explorer.bio-rad.com.



Newest Products

New Science of Opioid Dependence Kit

The Science of Opioid Dependence kit puts your students in the roles of doctor and researcher as they explore potential genetic links to a real-world problem: opioid dependence. With this kit, your students are introduced to precision medicine as they outline a human genetic research study; they will conduct gel electrophoresis on preamplified PCR samples from patient DNA to determine whether a mutation in a human dopamine receptor gene influences opioid dependence. Your students will also consider environmental factors that contribute to dependence as a phenotype and suggest treatment strategies based on the results.

- Curriculum connections to genetics, neurobiology, DNA structure, PCR, and statistical analysis
- Preamplified PCR DNA samples to teach PCR without a thermal cycler



- Five activities with optional timelines and branch points

For More Information
Web: bio-rad.com/opioidkit

Ordering Information

Catalog #	Description
17005316EDU	Science of Opioid Dependence Kit , includes DNA samples, molecular weight ruler, loading dye, and microcentrifuge tubes; provides materials for 32 students or 8 workstations
17005297EDU	Science of Opioid Dependence Kit plus Fast Blast Electrophoresis Reagents , includes DNA samples, molecular weight ruler, loading dye, Fast Blast DNA stain, agarose, TAE buffer, and microcentrifuge tubes; provides materials for 32 students or 8 workstations
17005313EDU	Science of Opioid Dependence Kit plus UView Electrophoresis Reagents , includes DNA samples, molecular weight ruler, UView 6x loading dye and stain, agarose, TAE buffer, and microcentrifuge tubes; provides materials for 32 students or 8 workstations

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

New Engineering Solutions for Global Health Kit

Bring engineering into your biology classroom as your students design a solution to a complex real-world problem: malnutrition. World hunger is a global health crisis that affects millions. Using this context, students study proteins and nutrition. In this activity, students use a Bradford assay to collect data and design a treatment proposal for protein energy undernutrition (PEU). They use an iterative engineering design approach to define the problem, create and test a prototype, and revise their solutions.



The Engineering Solutions for Global Health Kit supports three-dimensional learning. It includes three activities:

- Activity 1: Understanding Protein Undernutrition
- Activity 2: Investigating Protein Content in Food
- Activity 3: Designing a Treatment Proposal for Protein Undernutrition

The kit provides:

- A framework for students to evaluate design constraints using data to support claims

- Opportunities for students to think critically about complex global issues
- Instructor's Guide, background information on Bradford assay, and lesson materials
- All consumables and reagents for 96 students (24 workstations)

For More Information
Web: bio-rad.com/esgh

Ordering Information

Catalog #	Description
17005278EDU	Engineering Solutions for Global Health Kit , includes Quick Start Bradford assay reagent, Protein Standard II, conical tubes (100), disposable transfer pipets (500), and curriculum; provides materials for 96 students or 24 workstations

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

Giant Panda Problem Kit for AP Biology

Can your students help save the giant panda population?

In recent decades, the giant panda population has been severely threatened by habitat destruction, poaching, and slow reproduction. Have your students take on the role of conservation biologist as they design experiments to assess fertility in giant pandas using the power of an enzyme-linked immunosorbent assay (ELISA).

- Curriculum and materials for 2 inquiry-based laboratories and 2 additional activities
- Genuine antibody and antigen ELISA
- Student-designed protocols and data collection



ThiNQ! investigation kits provide materials and curriculum for flexible, inquiry-based labs.



For More Information
Web: bio-rad.com/panda

Ordering Information

Catalog #	Description
17002878EDU	Giant Panda Problem Kit for AP Biology , includes reagents, disposable plastic transfer pipets, microplates, tubes, and curriculum, including teacher manual; provides materials for 32 students or 8 workstations

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

Photosynthesis and Cellular Respiration Kit for AP and General Biology

Energy transfer your students can actually see!

Have your students explore both photosynthesis and cellular respiration with premade algae beads in a simple, easy-to-use colorimetric assay.

Microalgae immobilized in alginate beads cause a vibrant shift in the color of indicator solution depending on whether photosynthesis or cellular respiration is dominant.

- Ready-to-use, reliable, and reusable algae beads
- Two kits available — one aligned to AP Biology standards and the other to the needs of general biology classrooms
- Student-generated, quantifiable data
- Optional protocol for spectrophotometry



ThINQ! investigation kits provide materials and curriculum for flexible, inquiry-based labs.

For More Information

Web: bio-rad.com/algae

Ordering Information

Catalog #	Description
17001238EDU	Photosynthesis and Cellular Respiration Kit for AP Biology , includes algae beads, colorimetric CO ₂ indicator, consumables, and curriculum including teacher manual; provides materials for 96 students or 24 workstations
12005534EDU	Photosynthesis and Cellular Respiration Kit for General Biology , includes algae beads, colorimetric CO ₂ indicator, consumables, and curriculum including answer key; provides materials for 96 students or 24 workstations

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

New **Biotechnology: A Laboratory Skills Course, Second Edition**

The second edition is new this year.

This laboratory textbook blends textbook theory with hands-on laboratory activities and real-world applications for your biotechnology course, and it incorporates Bio-Rad Explorer kits for easy implementation supported by live technical support. This textbook encourages the next generation of biotechnologists by:

- Developing key skills with multiple activities
- Encouraging students to consider the broader implications of biotechnology with bioethics case studies
- Broadening occupational awareness with profiles of careers in biotech
- Letting students answer a research question using independent research

The teacher supplement provides a thorough background on preparation, setup, results analysis, and assessment. It also provides guidance on how to implement and build your biotechnology course. Chapters include:

- The Biotechnology Industry
- Laboratory Skills
- Microbiology and Cell Culture
- DNA Structure and Analysis
- Bacterial Transformation and Plasmid Purification
- Polymerase Chain Reaction
- Protein Structure and Analysis
- Immunological Applications
- Research Projects

For More Information

Web: bio-rad.com/textbook

**Ordering Information**

Catalog #	Description
17004717EDU	Biotechnology: A Laboratory Skills Course, Second Edition , teacher edition, includes one student edition and one teacher supplement
12008528EDU	Biotechnology: A Laboratory Skills Course, Second Edition , student edition
12008527EDU	Biotechnology: A Laboratory Skills Course, Second Edition , teacher supplement
1661051EDU	Laboratory Notebook , one notebook
1661053EDU	Laboratory Notebook , classroom set of 32

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

Advanced Project-Based Kits

Modular Kits for Complete Laboratory Workflows

Integrated College Level Molecular Biology Labs

Looking for authentic project-based learning lab experiences that carry a gene or protein of interest from isolation to analysis?

Bio-Rad's modular lab series provides validated procedures, easy preparation, and reproducible success year after year. Visit bio-rad.com/EDU/highered to learn about our advanced series for cloning, sequencing, bioinformatics, and protein expression and purification using affinity chromatography. These flexible, modular lab series can be used as capstone projects or a complete molecular biology course.

Cloning and Sequencing Explorer Series*

1. Nucleic Acid Extraction
2. *GAPDH* PCR
3. Electrophoresis
4. PCR Kleen Spin Purification
5. Ligation and Transformation
6. Microbial Culturing
7. Aurum Plasmid Mini Purification
8. Sequencing and Bioinformatics

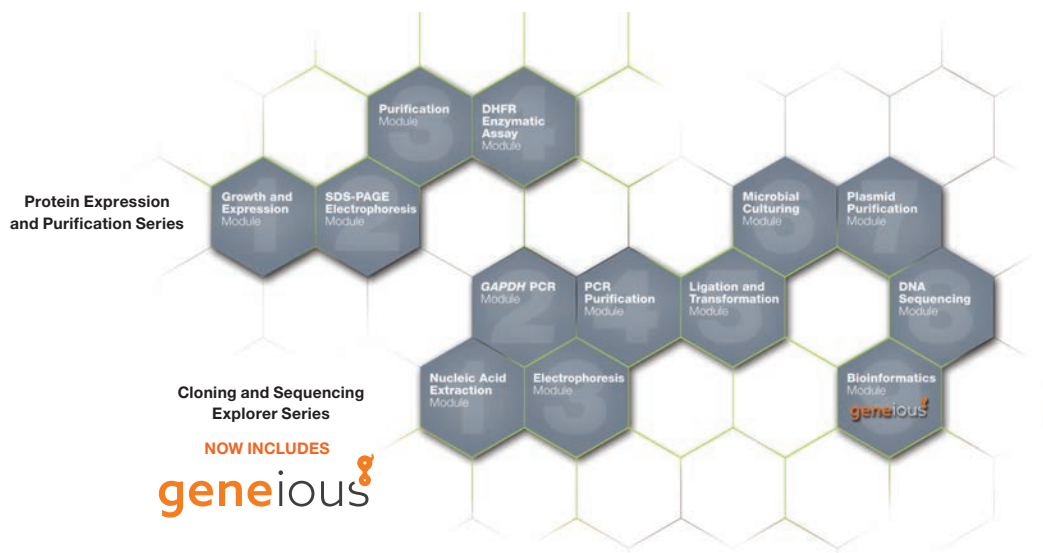
Protein Expression and Purification Series*

1. Growth and Expression
2. SDS-PAGE Electrophoresis
3. Purification Process Options:
 - Centrifugation Purification
 - Hand-Packed Column Purification
 - Prepacked Cartridge Purification
4. DHFR Enzymatic Assay
5. Assessment

* Available as a complete series or as individual modules.

For More Information

Web: bio-rad.com/cloninglab
bio-rad.com/proteinpurificationlab



Ordering Information

Catalog #	Description
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Cloning and Sequencing Explorer Series

1665000EDU*	Complete Cloning and Sequencing Explorer Series , includes all 8 modules (sequencing service not included)
1665005EDU*	Nucleic Acid Extraction Module
1665010EDU*	<i>GAPDH</i> PCR Module
1660451EDU	Electrophoresis Module
7326300EDU	PCR Kleen Spin Purification Module
1665015EDU*	Ligation and Transformation Module
1665020EDU	Microbial Culturing Module
7326400EDU	Aurum Plasmid Mini Purification Module
1665025EDU*	Sequencing and Bioinformatics Module , includes sequencing primers, control plasmid, and bioinformatics subscription; sequencing service not included

continues

Ordering Information

Catalog # Description

Protein Expression and Purification Series

1665040EDU*	Protein Expression and Purification Series , centrifugation purification process
1665045EDU*	Protein Expression and Purification Series , hand-packed purification process
1665050EDU*	Protein Expression and Purification Series , prepacked purification process
1665070EDU	Protein Expression and Purification Series Assessment Module , formative and summative assessment tool
1665055EDU*	Growth and Expression Module
1665060EDU*	SDS-PAGE Electrophoresis Module
1665041EDU	Centrifugation Purification Module
1665046EDU	Hand-Packed Purification Module
1665051EDU	Prepacked Purification Module
1665065EDU*	DHFR Enzymatic Assay Module

* Ships with both temperature-sensitive and room temperature components. Immediately store temperature-sensitive items at 4°C or -20°C as indicated.

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

V3 Western Workflow (Stain-Free Rapid Blotting)




Western Blotting in Less than 2 Hours!

The rapid blotting or V3 Western Workflow (stain-free rapid blotting) allows you to complete an entire western blot workflow in less than 2 hours in the classroom. TGX Stain-Free gels combined with the super-fast Trans-Blot Turbo transfer system provide maximum time savings, allowing you to complete the workflow in a single lab block period. Teach students about the exciting chemistry that allows visualization of samples separated on PAGE gels without staining.

For More Information

Web: bio-rad.com/EDU/rapidblotting

Hands-On Time Expenditure (in minutes)

	 Tank blotting	vs.  Rapid blotting (staining required)	+  V3 Western Workflow (stain-free rapid blotting)
Protein extraction and electrophoresis	33	33	33
Protein visualization	180	180	<3
Protein transfer			
Equilibration	15	0	0
Setup	30	5	5
Transfer	30-150	15	15
Immunoblotting	45	45	45
Color detection	All options: 10 min to overnight		
Total hands-on time	343-463 (5 hr 43 min to 7 hr 43 min)	288 (4 hr 48 min)	111 (1 hr 51 min)

Total time savings of 55 min to 7 ½ hr

Ordering Information

Catalog # Description

1662875EDU	Rapid Blotting and V3 Western Workflow Starter Kit , comprehensive protein classroom study kit, includes protein profiler module (#1662700EDU), western blot module (#1662800EDU), Trans-Blot Turbo mini nitrocellulose transfer pack, TGX Stain-Free gels, application note, for 32 students
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EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

Real-Time PCR Kits

How Much DNA Is There?

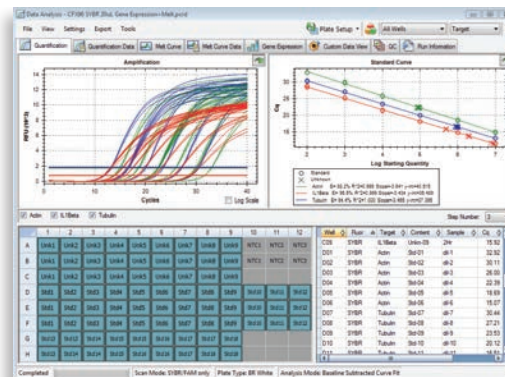
The Bio-Rad Crime Scene Investigator PCR Basics kit is a good starting point for novices to become familiar with using real-time PCR technology. Additionally, DNA fingerprints can still be investigated using gel electrophoresis and melt curve analysis, showing how real-time and standard PCR can be complementary techniques.

The Bio-Rad GMO Investigator kit is a tool for teaching the principles of PCR and its use in testing foods for genetic modifications. Demonstrate how much plant DNA is present and then compare how much genetically modified organism (GMO) DNA is recovered from each food sample when using real-time PCR. It is even possible to determine what fraction of a food product has been made with genetically modified ingredients in the same manner standard testing labs do.

- Quantify DNA
- Discover key differences between standard and real-time PCR analysis
- Analyze and evaluate real-time PCR results
- Perform melt curve analysis
- Determine the accuracy and reliability of pipetting techniques
- Learn DNA amplification using real-time PCR

For More Information

Web: bio-rad.com/EDU/real-time



Ordering Information

Catalog #	Description
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1662660EDU	Crime Scene Investigator PCR Basics Real-Time PCR Starter Kit
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1662560EDU	GMO Investigator Real-Time PCR Starter Kit
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EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

Fish DNA Barcoding Kit

What happens if one fish gets substituted for another?

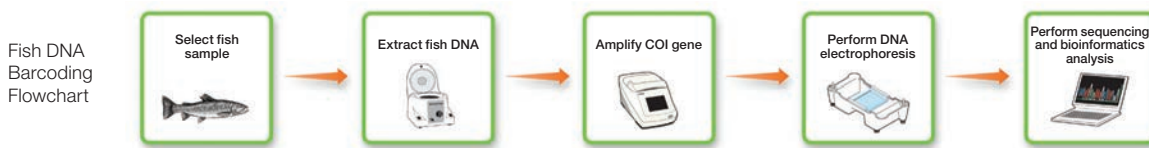
Most of the time, the consumer won't even notice. But what happens if substituting a less expensive fish for a more expensive one becomes a common practice? Or if a poisonous fish like pufferfish makes it into our food supply, or we deplete our oceans of critically endangered species? Bio-Rad's Fish DNA Barcoding kit helps students answer these and similar real-world questions, contributing to

the global species barcoding initiative while also learning advanced genetic analysis skills.

- Real-world application
- Inquiry-based hands-on laboratory
- Aligns with AP Biology Big Ideas 1, 2, 3, and 4

For More Information

Web: bio-rad.com/fishbarcoding



Ordering Information

Catalog #	Description
1665100EDU	Fish DNA Barcoding Kit , includes reagents for DNA extraction and PCR for up to 16 fish samples. Purchase sequencing module (U.S. only) separately
1665115EDU	DNA Barcoding Sequencing Module , prepaid sequencing service for up to 9 samples. Includes shipping of samples. Valid for use with 1665100EDU. U.S. only

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

Classroom Kits

Bio-Rad Explorer Kits

Bio-Rad Explorer kits address the critical need for inquiry-based activities — an important component of scientific literacy for an educated citizenry and a launch point of experience and practical training for students interested in careers in life science. The kits range from introductory to advanced topics, including courses guiding students through entire molecular biology workflows. ThINQ! Investigation kits encourage open inquiry in the classroom.

Areas of biotechnology applications covered include:

- Transformation and microbiology
- Protein analysis and chromatography
- DNA analysis
- PCR amplification
- Fully developed course series in DNA and protein (see page 446)



For a complete product listing, please refer to the [Bio-Rad Life Science Education Catalog \(bulletin 2112\)](#) or visit explorer.bio-rad.com.

Ordering Information

Catalog #	Description
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Introductory Kits

17005278EDU	Engineering Solutions for Global Health Kit , provides materials for 96 students or 24 workstations
1660003EDU*	pGLO Bacterial Transformation Kit , provides materials for 32 students or 8 workstations
1662300EDU	Genes in a Bottle Kit , includes 1 DNA extraction module (#1662000EDU) and DNA necklace module (#1662250EDU); provides materials for 36 students or 9 workstations
1665075EDU	IDEA Kit — Inquiry Dye Electrophoresis Activity , provides materials for 32 students or 8 workstations
1665090EDU	STEM Electrophoresis Classroom Kit , provides materials for 32 students or 8 workstations
1662900EDU*	Got Protein? Kit , provides materials for 320 students or 80 workstations
1665030EDU	Microbes and Health Kit , provides materials for 32 students or 8 workstations
1660008EDU	Size Exclusion Chromatography Kit , provides materials for 32 students or 8 workstations
1662400EDU*	ELISA Immuno Explorer Kit , provides materials for 48 students or 12 workstations

Intermediate Kits

1665120EDU	C. elegans Behavior Kit , provides materials for 32 students or 8 workstations
1665035EDU*	Biofuel Enzyme Kit , provides materials for 32 students or 8 workstations
1660007EDU*	Forensic DNA Fingerprinting Kit , provides materials for 32 students or 8 workstations
1660013EDU*	pGLO Kit SDS-PAGE Extension , provides materials for 32 students or 8 workstations
1660005EDU*	Green Fluorescent Protein (GFP) Chromatography Kit , provides materials for 32 students or 8 workstations
1660006EDU*	Secrets of the Rainforest Kit , provides materials for 32 students or 8 workstations
1660001EDU*	Analysis of Precut Lambda DNA Kit , provides materials for 32 students or 8 workstations
1660002EDU*	Restriction Digestion and Analysis of Lambda DNA Kit , provides materials for 32 students or 8 workstations
1662700EDU*	Comparative Proteomics Kit I: Protein Profiler Module , provides materials for 32 students or 8 workstations
17005316EDU	Science of Opioid Dependence Kit , provides materials for 32 students or 8 workstations

continues

Ordering Information

Catalog #	Description
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Advanced Kits

1662800EDU*	Comparative Proteomics Kit II: Western Blot Module , provides materials for 32 students or 8 workstations
1662600EDU*	Crime Scene Investigator PCR Basics Kit , provides materials for 32 students or 8 workstations
1662100EDU*	PV92 PCR Informatics Kit , provides materials for 32 students or 8 workstations
1662500EDU*	GMO Investigator Kit , provides materials for 32 students or 8 workstations
1662875EDU	Rapid Blotting and V3 Western Workflow Starter Kit , provides materials for 32 students or 8 workstations
1665100EDU	Fish DNA Barcoding Kit , provides materials for 32 students or 8 workstations
1662560EDU	GMO Real-Time PCR Starter Kit , provides materials for 32 students or 8 workstations
1662660EDU	Crime Scene Investigator PCR Basics Real-Time PCR Starter Kit , provides materials for 32 students or 8 workstations
1665000EDU	Cloning and Sequencing Explorer Series , 8 modular activities
1665040EDU	Protein Expression and Purification Series — Centrifugation Purification Process
1665045EDU	Protein Expression and Purification Series — Hand-Packed Purification Process
1665050EDU	Protein Expression and Purification Series — Prepacked Purification Process

ThINQ! Investigation Kits

17001238EDU	Photosynthesis and Cellular Respiration Kit for AP Biology , provides materials for 32 students or 8 workstations
12005534EDU	Photosynthesis and Cellular Respiration Kit for General Biology , provides materials for 96 students or 24 workstations
1660335EDU	pGLO Transformation and Inquiry Kit for AP Biology , provides materials for 32 students or 8 workstations
17001235EDU	Biofuel Enzyme Reactions Kit for AP Biology , provides materials for 32 students or 8 workstations
17002878EDU	Giant Panda Problem Kit for AP Biology , provides materials for 32 students or 8 workstations

* Ships with both temperature-sensitive and room temperature components. Immediately store temperature-sensitive items at 4°C or -20°C as indicated.

EDU price discounts are for qualified educational institutions and educators only. Items are available at list price for noneducators (must be ordered without an EDU suffix).

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AMPLISIZE	ECONO-PAC	QUANTUM PREP
BIO-DOT	GENE PULSER	QX ONE
BIO-GEL	HARD-SHELL	READY GEL
BIO-LYTE	HELIOS	SUB-CELL
BIO-PLEX	IMMUN-BLOT	TITERTUBE
BIO-RAD	MACRO-PREP	TRANS-BLOT
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